PSYCHOLOGICAL ASPECTS OF LONG-DISTANCE RUNNING AMONG SOUTH AFRICAN MARATHON RUNNERS

by

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SUMMARY

The purpose of this study was to determine why South African long-distance runners start and continue to run long distances, what perceived psychological benefits and negative effects they experience as a result of their involvement in the sport, and what thoughts and emotions are associated with the runner's high. Questionnaires were sent to 2 000 1992 Two Oceans Marathon participants and 777 responded. Results show that South African long-distance runners start running chiefly for physical fitness and health reasons, and continue for these reasons as well as psychological benefit reasons. As a result of their involvement in the sport, they experience psychological benefits such as a positive mood, positive self-image and positive mental outlook. When unable to run, these benefits are reversed. They also experience negative effects such as relationship problems because of long-distance running. Many thoughts and emotions are associated with the runner's high, but most define it as an euphoric feeling.

KEY TERMS

1. Long-distance running
2. South African long-distance runners
3. Marathon runners
4. Ultra-marathons
5. Psychological aspects of long-distance running
6. Motivation for initial participation
7. Motivation for continued participation
8. Perceived psychological benefits
9. Perceived negative effects
10. Runner's high

CHAPTER ONE

THE PASSION OF LONG-DISTANCE RUNNING

Olympic champion, Emil Zatopek, once said, "If you want to experience another life, run a marathon" (cited in Treadwell, 1987, p.9). Those who have never been involved in the sport of running, let alone marathon running, may regard Zatopek's claim with scepticism and as nonsensical sentiment. However, before one does so, it is necessary to consider the history of the marathon as well as the current mass popularity the sport enjoys.

A marathon may be defined as a long distance footrace of 42,2 km. It began and takes its name from a locale in ancient Greece. Although the evidence is vague and meagre, historians report that in 490 B.C., Pheidippides, an Athenian messenger, ran approximately 40 km from the battlefield of Marathon to Athens to bring news of the Greeks' victory over the Persians. Apparently, he then collapsed and died. When Baron Pierre de Coubartin decided to revive the Olympic Games, colleague Michel Breal suggested including a race of almost 40 km, from the modern town of Marathon to the stadium at Athens, to commemorate the legend of Pheidippides. Accordingly, the race which became known as the Marathon, was held on 10 April 1896, the final day of the first modern Olympic Games at Athens. Twenty-five started the race which was won by Spiros Louis, a Greek (Giradi, 1972; Martin, Benario & Gynn, 1977; Schomer, 1984; Treadwell, 1987).

At the 1908 Olympics in London the course of the Marathon was extended to 42,2 km so that it could start at the royal residence at Windsor Castle and finish at the royal box in the stadium.

However, it was only in 1921, at a conference of the International Amateur Athletic Federation, that 42,2 km became the standard distance for marathons (Schomer, 1984; Treadwell, 1987). Since this standardization many kinds of endurance races have been established, but according to Schomer (1984), it is the marathon which has achieved greatest popularity.

Until the early seventies running marathons and other long-distance races was considered to be the domain of the elite athlete and could not be run safely and rewardingly by all. According to Treadwell (1987), the popularity of long-distance running began when Frank Shorter of USA won the Olympic marathon in 1972 at Munich. At this time not only elite runners participated in the New York Marathon, but mediocre runners who had not accomplished fast times were attracted to run it. When this marathon was first run in 1970, it attracted a mere 126 runners. In 1976, when the New York Marathon was removed from its pastoral setting and run through the five boroughs of the city, there were 2 000 entrants (Treadwell, 1987). This figure rose to 15 906 in 1982 (Burfoot, Wischniab & Post, 1980). Entries for the 1992 New York Marathon included runners from every continent except Antarctica. The 10 612 foreign entries comprised one-third of the field and came from 91 countries (Lobb, 1994). Race organizers now accept 30 000 of the 40 000 applicants each year (Lobb, 1994). Furthermore, Burfoot et al. (1980) reported that 80 000 runners completed at least one marathon in USA in 1979. An American Sports Data survey revealed that there were 70 000 'serious' runners in USA in 1986, who consistently trained at least 64 km per week, and whose running schedules included the 42,2 km marathon distance (Treadwell, 1987). There are no statistics available for USA for 1995.

When one considers the above-mentioned statistics, neither Fixx's statement, "To-day, however, we are in the midst of a worldwide running revolution, a revolution that is beyond question changing - and saving - lives" (1977, p.x), nor Callen's (1983b) claim that few activities have ever generated more enthusiasm and interest than long-distance running, are unfounded generalizations. Although Fixx and Callen were referring specifically to the population of USA, statistics show that long-distance running experiences mass popularity throughout the world. Entries for marathons which are held in major cities annually often exceed 5 000; moreover, these entrants often come from many different nations. Examples include the Dublin Marathon with 7 000 competitors from 30 nations, the Melbourne Marathon with 5 000 competitors from 12 nations, the Montreal Marathon with 10 000 competitors from 20 nations, the Rio de Janeiro Marathon with 7 000 competitors from 20 nations and the Stockholm Marathon with 12 000 competitors from 34 nations (Treadwell, 1987). Since the fall of the Berlin Wall, the Berlin Marathon has attracted more than 25 000 runners from 60 countries (Williams, 1992). Yearly the London Marathon has in excess of 80000 applicants from 47 countries, of whom approximately 25 000 are chosen to participate (Treadwell, 1987; Williams, 1992).

Whilst the popularity of long-distance running worldwide is evident from examining statistics from marathons, South Africans have tended to concentrate on ultra-marathons, namely races longer than 42,2 km. The acceptance and popularity of long-distance running in South Africa is clearly revealed when one examines statistics from two ultra-marathons in the country: The Two Oceans Marathon and Comrades Marathon are "firmly established as the premier road running events in the country, attracting by far the most participants" (Cameron-Dow, 1989, p.xi). The Comrades Marathon is a gruelling 90 km ultra-marathon run from Durban to Pietermaritzburg or vice versa on each year. In 1921,

the year of its inception, 34 runners participated in the race. This figure only rose to 98 in 1961 and 925 in 1971. However, it was during the eighties that the number participating in road running and consequently in the Comrades Marathon showed a marked increase. In 1981 there were 3665 finishers. By 1983 this figure had risen to 5 375 and in 1985, there were 8 194 runners who crossed the finishing line within the stipulated time of eleven hours (Alexander, 1985). In 1992, 13 237 runners entered, of whom 10 692 finished (Comrades Marathon Association, 1992). The Two Oceans, a 56 km ultra-marathon run alongside the coast near Cape Town on Easter Saturday, was first run in 1970. Of the 26 starters, 15 managed to finish the course within the six hours allowed. In 1975, only 123 finished the race (Cameron-Dow, 1989). According to race organizer, Annemarie Sainsbury (personal communication, 5 December 1994), 1 594 entered and 1 383 completed the race in 1980, 5 469 entered and 1 383 completed it in 1986, 8 169 entered and 6 126 completed it in 1989, and 8 701 entered and 7 138 completed it in 1992.

Statistics from the Comrades Marathon and Two Oceans Marathon are indicative of the enthusiasm South Africans have for running. However, to gain a more accurate picture of the state of road running in South Africa, other data must be considered. According to Lynette Baker, secretary of the South African Road Running Association, there were approximately 60 000 registered road runners in the country in 1992 (personal communication, 9 September 1992). Furthermore, the Official Handbook of Athletics South Africa (1992/3) listed 465 road running clubs in South Africa and the official fixture lists for 1992 detailed 624 road races ranging from 5 km to 160 km. This figure included 187 half-marathons (21,1 km races), 83 marathons and 31 ultra-marathons. Cottrell (1993) gives details of 723 road races for

1994 in South Africa in his book, *Runner's Guide to Races in South Africa 1994*.

According to Callen (1983a), the acceptance, growth and popularity of running has resulted in an entire subculture complete with its own language, myths, heroes, dress, traditions and literature. There is a proliferation of studies which deal with the physiology of running. Both positive and negative aspects, especially cardiovascular benefits and physical injuries, have been investigated (Chan & Lai, 1990). The psychological aspects, in particular benefits of the sport have, however, been recognized by many. Conservationist, John Hanks, recently said, "My day without running just wouldn't be as productive as it is when I do run" (Green, April 1994, p.44). Similarly, broadcaster Chris Gibbons claims, "Running gives me time alone, and allows me to organize my thoughts for the day" (Green, 1993, p.32). Running guru, George Sheehan, stated, "Running made me free. It rid me of concern for the opinion of others ... Running was discovery" (Noakes, 1994, p.12). Noakes also expressed a similar idea when he wrote, "The first way in which running has influenced my life is that it has taught me who I am and, equally importantly, who I am not" (1992, p.1). Moreover, some have acknowledged a dependence on the sport. Comrades Marathon champion, Tilda Tearle, recently said, "The problem is that when I am not running, I get withdrawal symptoms. No kidding I get headaches and all kinds of things. I even hate other runners" (McClelland, 1994, p.62). Yates (1987, p.202) reported a runner as saying, "If I can't run, I feel as if I'm full of dirty dishwater". Banker, Richard Laubscher, said, "I also find that if I don't get my daily run in, I tend to get irritable" (Green, March 1994, p.32). This dependence is clearly epitomized by considering a statement from well-known runner, Waldemar Cierpinski: "It's the passion of my life ... Without

running I wouldn't be able to live" (cited in Noakes, 1992, p.300).

Upon examining popular running literature, similar statements can be found. Books such as Kostrubala's (1976) *The Joy of Running* and Fixx's (1977) *The Complete Book of Running* claim that running alleviates ailments such as depression, anxiety, alcoholism and agoraphobia. These claims have been regarded with scepticism by a few. Perry and Sacks (1981, p.69) pointed out that " it seems as though every time someone with a problem puts on a pair of running shoes the list of running cures becomes longer". Carmack and Martens (1979) suggested that Kostrubala's observations have been limited to his introspection and a very narrow sample of patients he has treated. They suggested further that Henderson's (cited in Carmack & Martens, 1979) claims concerning the addicting quality and beneficial psychological affects of 'meditative' running were pure speculation, based upon years of personal running experience and could, therefore, not be generalized.

Although popular running literature has concerned itself with the psychological aspects of the sport, it is very subjective, introspective and contains many generalizations. Few scientific studies have measured the psychological aspects of long-distance running. Studies, such as Carmack and Martens (1979), Harris (1981a), Koplan, Powell, Sikes, Shirley and Campbell (1982), Summers, Machin and Sargent (1983), Hogan and Cape (1984) and Okwumabua, Meyers and Santille (1987) have concerned themselves primarily with the reasons runners started and continue to run. Studies, such as Brown, Ramirez and Taub (1978), Wilson, Morley and Bird (1980), Callen (1983b), Dyer and Crouch (1987) and Chan and Lai (1990) have focused on the emotional and mental benefits runners believe they derive from running. Furthermore, a few studies have focused on the negative psychological moods runners experience when they are unable to run as well as the negative

consequences of the sport. Such studies include Carmack and Martens (1979), Thaxton (1982), Chan and Grossman (1988) and Morris, Steinberg, Sykes and Salmon (1990). Studies such as Summers, Sargent, Levy and Murray (1982), Callen (1983b) and Masters (1992) have paid attention to the experience of the "runner's high". Although this concept is associated with ambiguity and controversy, most define the runner's high as an experience of unreal happiness while running.

Most of the studies undertaken to measure psychological aspects of running have been conducted with small samples in the United States. A few studies have been conducted elsewhere in the world, such as Australia, United Kingdom, Canada, Hong Kong and Sweden. No known publicized studies, dealing with the above-mentioned psychological aspects, have, as yet, been undertaken in South Africa. The question may be posed: Do South African long-distance runners have the same psychological experiences as runners elsewhere?

Consequently, the purpose of the present study is an attempt to answer the following questions:

1. Why do South Africans start and continue to run long distances?
2. What positive benefits do South African marathon runners associate with their sport?
3. What negative effects do South African marathon runners associate with their sport?
4. What thoughts and moods do South African long-distance runners associate with the "runner's high" phenomenon, if they experience this euphoric feeling when running?
5. Do South African runners who experience the runner's high perceive psychological benefits with the same intensity as those runners who do not experience the runner's high?

In order to answer the questions outlined above, a questionnaire was sent out to a random sample of 2 000 runners who entered the 1992 Two Oceans Marathon. Seven hundred and seventy-seven questionnaires were returned; thus, the response rate was 38,85%.

Chapter Two of this dissertation deals specifically with those studies which have concerned themselves with the research problems of the present study. The subsequent chapters concentrate on the research method employed, results and deductions derived from this study.

CHAPTER TWO

RECENT RESEARCH CONCERNING THE PSYCHOLOGICAL ASPECTS OF DISTANCE RUNNING

The limited research dealing with the psychological aspects of distance running have focused primarily on motivation for participation, perceived mental and emotional benefits, negative psychological effects and the runner's high. As the present study concerns itself with these aspects, a discussion of recent research of these psychological aspects of distance running follows. Most of the relevant studies have not dealt exclusively with only one of the above aspects; however, for the sake of clarity each will be discussed separately.

2.1 Motivation for Participation

Motivation has been defined in a variety of ways, but according to Reber (1985, p.454), most "regard it as an intervening process or an internal state of an organism that impels or drives it to action." Similarly, Buss (1978, p.570) defines it as "the factors that arouse an organism to exhibit goal-directed behavior." In other words, "motivation is an energizer of behavior." (Reber, 1985, p.454).

The question may be posed, 'Why do people start and continue to run long distances? What motivates them to run long distances?' The majority of studies dealing with the psychological aspects of running have addressed these questions. These studies will be discussed in chronological sequence.

Sachs and Pargman (1979) interviewed 12 adult males between the ages of 23 and 48 years. Those interviewed included runners who

ran occasionally as well as those who ran extensively. The researchers did not clearly define what they meant by the terms, 'occasionally' and 'extensively', but merely stated that those who ran 'extensively', ran great distances. Furthermore, they did not indicate how many of the sample ran occasionally and how many ran extensively. Sachs and Pargman chose to use the interview method because of its flexibility. This method, however, has disadvantages: Findings are not easily quantified and the interpretation of the responses may be subjective. According to Sachs and Pargman most of the interviewees ran for reasons of general health, staying in shape, body weight and relaxation. No indication of the exact proportions of those interviewed who gave these reasons was given. Moreover, no distinction was made between reasons for starting to run and reasons for continuing to run. These abovementioned factors limit the generalizability of their findings.

Carmack and Martens (1979) were critical of researchers such as Kostrubala and Henderson who made generalizations about the psychological aspects of distance running, based on small samples and subjective, introspective methods. This criticism could also be applied to Sachs and Pargman (1979), who have been discussed above. Consequently, in order to gather reliable descriptive data from a large sample of runners who represented a wide range of experience and abilities, Carmack and Martens employed the following method: 315 runners, from Illinois and Indiana in USA, who ranged between 13 and 60 years of age responded to questionnaires. These runners were sampled from a wide variety of situations, namely competitive road races, an Olympic training clinic, a high school camp and community 'fun runs'. One may conclude, then, that the sample was to some extent representative of the running population in the area. Unfortunately, the number of questionnaires originally sent is not indicated and thus, the response rate cannot be determined.

One of the purposes of the Carmack and Martens study (1979) was to assess reasons for beginning and reasons for continuing running. Consequently, respondents were requested to give three reasons why they started to run and three reasons why they continue to run. The five most frequent reasons given for starting to run were to get in shape (14%), enjoyment (8%), lose weight (8%), maintain fitness (6%) and because they "were good at it" (5%). The five most frequent reasons given for presently running were to maintain fitness (19%), enjoyment (12%), competition (6%), weight control (5%) and "feeling better" (5%). The researchers originally classified these reasons into 72 broad categories which they finally condensed into eight, namely physical health, psychological health, affiliation, goal achievement (competition and challenge), tangible rewards, others' influence, availability or something to do and miscellaneous (too specific or infrequent to classify). On analyzing the five most frequent reasons for starting and continuing to run, Carmack and Martens concluded that people start to run mainly for physical health, and continue running for physical health, psychological health and goal achievement. Although assessing reasons for running was not the main purpose of their study, it is unfortunate that Carmack and Martens did not indicate the percentage of responses for each category.

Harris (1981a) sent questionnaires to runners in New Mexico, USA. Four hundred and eleven runners, namely 277 males and 132 females responded. Unfortunately, as with the Carmack and Martens (1979) study, the response rate cannot be determined. The respondents ranged between 10 and 71 years of age, had been involved in running from 1 month to 50 years, and ran anything from 1 to 192 kms per week. At a glance this sample may appear to be representative of runners. However, as exact statistics regarding the sample are not detailed, and because only a single geographical

area was surveyed, this deduction cannot be made. Findings show that 92,5% ran because they felt better physically, 87,3% because they felt better psychologically, 58,4% for weight control and 55,5% for relaxation. No differentiation was made between reasons for initial involvement and those for adherence; this may be viewed as a limitation. Furthermore, no differentiation in the final analysis of results was made between male and female.

Harris (1981a) considered the self-report nature of the questionnaire as a limitation. According to Iso-Ahola (1980), self-report measures may generate general and rather vague stereotyped responses and these stereotypical culturally acceptable explanations may conceal more important underlying reasons. A similar view is held by psychoanalyst, Sachs (1984), who maintains that people do not tell the truth about themselves. He believes that many cite fitness as a reason for running whereas their real motive might be voyeuristic or exhibitionistic. However, as pointed out by Wankel and Kriesel (1985b), self-report measures are strengthened because they do not limit respondents, but give them freedom, ensuring completeness of information. Oppenheim (1966, p. 41) expressed a similar view when he wrote, "We obtain his ideas in his own language, expressed spontaneously, and this spontaneity is often extremely worthwhile as a basis for new hypotheses". The strengths and weaknesses of self-report measures portrayed above, are not only applicable to Harris' study, but all research which employs such measures.

Another study conducted by Harris (1981b) focused on women runners. Furthermore, Harris wanted to determine why women are now participating in what was once stereotyped as a male activity. One hundred and fifty-six women between 11 and 54 years of age, who had been involved in running from 2 months to

20 years in New Mexico, USA, responded to a questionnaire. This study has similar limitations to Harris' previous study (1981a): Because exact statistics are not given, one cannot state how representative the sample is and the response rate cannot be determined. The study is further limited because 27% of the respondents were located through a network of acquaintances, and not by means of random sampling. Findings showed that previous stereotypes, that had labelled women who ran as masculine, were no longer applicable. Consequently, women were no longer reluctant to run, but willingly participated in the sport. In fact, a primary reason given for running was that it enhanced their femininity. Previously, Harris and Ramsey (1974) and Harris and Hall (1978) also found that femininity is highly valued by women who run, and that running and femininity are not perceived as antithetical. These above-mentioned findings are in contrast to that of Balazs (1975) who found that when women enjoyed athletic success, they became afraid that they would lose their femininity. Unfortunately, Harris (1981b) did not indicate other reasons why women run.

Although the main purpose of a study by Koplan, Powell, Sikes, Shirley and Campbell (1982) was to attempt a more accurate estimate of the benefits and risks of recreational running, the study also assessed why recreational runners started and continued to run. Questionnaires were sent to 1 250 randomly selected males and 1 250 randomly selected females who entered the annual 10 km Peachtree Road Race in Atlanta, USA. The response rate was 55,4% for men and 58,4% for women. Only 3% of the 25 000 runners entered the race with times good enough to be seeded, making the race notably an event of community participation. The average distance run by the sampled runners was only 10 kms per week. This average weekly distance is much lower than that of competitive and elite runners who exceed 100 kms per week. Thus, one

may conclude that the sample was to some extent representative of recreational road runners in USA. However, Koplan et al. suggested that the sample need not be representative of universal recreational runners. They stated that before such an assumption could be made one would first have to compare the registrants of the Peachtree Road Race with runners worldwide. Furthermore, one would have to compare the respondents with the nonrespondents of the questionnaire.

Koplan et al. (1982) found that 47,5% of the male respondents and 40,7% of the female respondents started running to promote physical fitness, and consequently, to prolong life. The percentage of the male respondents and the female respondents who remained involved with the sport for this reason was 54,7% and 41,2% respectively. Notably, a greater percentage of women (12,3%) than men (6,8%) started to run in order to control their weight. Fewer respondents, namely 10,5% of women and 3,9% of men continued to run for weight reasons. Of the sample, 8,3% of the male respondents and 10,1% of the female respondents started to run because they 'felt' better and believed that running relieved tension. It is of interest to note that 21% of the male respondents and 30,7% of the female respondents remained in the sport for these benefits which may be viewed as psychological benefits. Thus, one may deduce that long-distance runners believe running contributes to psychological well-being.

The aim of research conducted by Summers, Sargent, Levy and Murray (1982) was to obtain reliable descriptive data on a large sample of middle-aged runners who were attempting a first marathon. A random sample of 500 runners between 30 and 50 years of age who entered the Big Milk Marathon in Melbourne, Australia were sent pre-race and post-race questionnaires. An excellent response rate of 72,6% for the pre-race questionnaire, which

assessed the respondents reasons for starting to run, was obtained. The post-race questionnaire did not focus on reasons for running. Fifty-nine percent of the respondents had started to run for reasons of physical health, namely to improve and maintain fitness, lose weight and to 'get into shape', whereas only 17% had started because of reasons of psychological health, namely, for relaxation and enjoyment. Unfortunately, the study did not assess the respondents' reasons for adherence to running. Thus, deductions concerning any possible change in reasons cannot be made.

However, in order to assess reasons people started and continue to run, Summers, Machin and Sargent (1983) sent questionnaires to every sixth entrant in the Big Milk Marathon in Melbourne, Australia. This marathon is a well-known race in Australia and entrants include runners from five Australian states (Treadwell, 1987). Of the 1 093 entrants who were sampled, 459 responded, indicating a 42% response rate. The respondents did not differ significantly from the other entrants in terms of age and finishing time. Each respondent was requested to state three reasons for becoming involved in the sport and three for adherence to it. Of the respondents, 41,2% and 10,74% became involved in running in order to improve fitness and lose weight respectively. These reasons may be classified as physical health reasons. Thus, 51,94% became involved for reasons of physical health whereas 53,5% of the respondents remained with the sport for these reasons. Furthermore, 18,5% remained in the sport for psychological health reasons (enjoyment and relaxation) and 12,6% for goal attainment. As with the Koplan et al. study (1982), one may deduce that runners believe that running contributes to psychological well-being; in this instance, relaxation and enjoyment.

Callen (1983b), in his study to determine what mental processes occur in a large sample of runners during and soon after running, also included a section on reasons why runners become involved in the sport. A broad spectrum of runners were sampled by placing questionnaires at track clubs, shops, in popular running magazines and distributing them personally to runners actively involved in the sport. Of the 1 000 questionnaires distributed, 424 usable responses were obtained, indicating a 42,2% response rate. Findings indicate that 73% of the respondents started to run to improve health and 54% for weight control; these may be classified as physical health reasons. Fifty-five percent had started to run purely for 'fun' or enjoyment; this may be classified as a psychological reason. Thirty-two percent had become involved so that they could compete in races; the underlying reasons behind this were not determined and thus, cannot be classified as physical, psychological or affiliation reasons. Once again, reasons for starting the sport were largely physical. As the reasons for adherence were not assessed, one cannot deduce if the original reasons for becoming involved in the sport changed with continued participation.

Hogan and Cape (1984) surveyed 32 marathon runners over the age of 60 in Canada purely to determine their most important motivational factors when starting and continuing to run. Runners were sent questionnaires 10 months after they had competed in the National Capital Marathon in Ottawa. It did not matter that 10 months had elapsed between the race and the distribution of the questionnaires because the purpose of the questionnaire was not directly related to the race as such, but to long-distance running. The researchers used the National Capital Marathon to obtain a sample of runners. Respondents were requested to list the single most important reason for becoming involved in and for remaining with the sport. This may be viewed as a limitation.

If the respondents had been asked to give more than one reason, more extensive findings may have been achieved. Furthermore, the extent to which the findings can be generalized is restricted because of the small sample. Findings, however, show that 28 of the sample of 32 started to run for physical reasons, namely to improve and/or maintain physical fitness, to have a physical challenge, to prolong life and to lose weight. Only 19 continued running for the same reasons. Only one respondent had started running for a psychological reason, namely to relieve tension. Twelve continued running for a psychological reason. Of these, six continued running for the psychological reason of enjoyment and six claimed to run because of psychological dependence or addiction to the sport. Although physical reasons remained prominent as long term motivational factors, they were not viewed as important for some of the respondents as they had been initially. One may deduce then that psychological reasons for running were not important motivators initially, but became so for some of the respondents.

Johnsgard (1985), too, attempted to differentiate current motives for running from those which originally got people going. One hundred and eighty subjects, namely 149 males and 31 females, who all belonged to the 50+ Runners' Association in USA and had been running for 10 years, were given the Test of Endurance Athlete Motives, more commonly referred to as TEAM. It consists of 10 motives; the strength of each is determined by 45 forced choices in a random paired-comparison format. According to Wankel and Kriesel (1985b), the advantage of such tests is that one can easily compare groups and it allows the respondents to consider the same total content before responding. However, Wankel and Kriesel point out that the paired-comparison approach is disadvantaged because it presupposes that respondents understand the items and share the same general meaning for them. Furthermore,

these forced choices do not allow the respondents to respond freely. These mentioned strengths and limitations of the paired-comparison approach are not only applicable to Johnsgard's study, but to all research which employs paired-comparison items.

The motives of TEAM, designed by and employed in Johnsgard's (1985) study, are thus listed alphabetically and defined:

(i)	Addictions	- stop or control anti-life habits such as smoking.
(ii)	Afterglow	- elevated mood and reduced tension.
(iii)	Centering	- space to be alone, clear my head and experience the world around me.
(iv)	Challenge	- perform better.
(v)	Compete	- challenge others and determine how I am doing in relation to others.
(vi)	Feels good	- training feels good.
(vii)	Fitness	- physical.
(viii)	Identity	- independent definition or statement about myself.
(ix)	Slim	- weight control.
(x)	Social	- meet new friends.

The reliability and validity of TEAM are not detailed in the Johnsgard (1985) study. However, each subject was given the test twice to check the reliability. On the basis of this retest method, Johnsgard proclaimed TEAM to be reliable, although no statistics were given. 'Fitness' remained the strongest motive for initial involvement and continued participation in the sport for both sexes. As with the Koplan et al. (1982) study, 'Slim', namely weight control, motivated more women than men for initial involvement. Moreover, the strength of this motive diminished for continued participation. Johnsgard suggested that weight maintenance might be taken for granted at this stage.

'Afterglow', 'Identity' and 'Centering' became stronger for both sexes after the initial involvement. These motives may be classified as psychological motives and thus, this finding is in accordance with the findings of the studies discussed thus far. Johnsgard speculates that it is expected that identity is enhanced with running because it can give runners greater awareness of control over their lives.

Lendvoy (1986) selected 205 runners in USA to complete a questionnaire to assess their reasons for starting a running program. The procedure for selecting the sample has not been detailed, limiting the study and deductions from its findings. The self-administered questionnaire consisted of three instruments:

(i) Initial Reasons for Running Scale (IRFRS) identified a wide range of reasons for beginning to run and the relative importance of each to the individual.

(ii) Life Event scale determined a variety of events experienced by adults and the relative effect of each.

(iii) External Influence scale (EIS) identified 17 environmental factors which may have influenced adults to begin running.

Results indicated that the IRFRS identified six factors, namely solitude, personal challenge, socialization, prevention, remedial and health. Unfortunately, no further details, definitions or strength of each were given. The EIS identified four factors, namely model, media, movie and participation. Once again, no details regarding these factors are given. The results of the bivariate and multi-variate analyses indicated that sex and age were not as useful in predicting motives for beginning running as were life event and external influence variables. These variables were not specified, further limiting the study. Although Lendvoy stated that his study was a beginning step in the explanation and prediction of reasons why adults begin exercise programs, it does not contribute to the reader's understanding of

physical and psychological factors which motivate one to begin and continue a running program.

Okwumbua, Meyers and Santille (1987) sent questionnaires to 700 master runners, namely those over 40 years of age, from seven 10 km races in USA. As 279 returned their questionnaires, a 42% response rate was achieved. The average time of involvement in the sport was seven years. Sixty-seven percent of the sample started running for physical benefits, but only 16,6% continued for this reason. On the other hand, 10,6% of the respondents started running for the psychological benefits of the sport and 29,8% continued for this reason. While 6,2% became involved in the sport for physical and psychological benefits, 38,4% remained in running for this combination of benefits. Thus, while physical reasons for running were important initially, they lost their significance with adherence. The opposite appears to be true for psychological benefits: Initially, they were not important motivators, but became so with continued involvement. These findings are in accordance with the previous studies discussed in this chapter.

Vitulli's (1987) study contributed similar results to the trend discussed in the previous paragraph. An open-ended questionnaire was distributed by mail to members of a local jogging association in USA. Unfortunately, no details regarding the sample are given. A further limitation of the study is that only 23 completed the questionnaire. Results show that respondents became involved in the sport for health and physical fitness reasons. However, with continued involvement more status was given to the enjoyment of running because of psychological benefits such as self-esteem and personal identity. This study confirmed the results of an earlier study conducted by Vitulli (1986).

Haase (1987) conducted in-depth interviews with 50 male marathon runners in USA to assess why people get involved in running. The interview, which was open-ended, was employed because of its flexibility; the disadvantages of the interview have already been discussed. Another limitation of this study was its small sample. Haase found that while most started running for motives related to weight loss and 'getting into shape', they began to attribute a wider variety of positive psychological effects to their programs after several years. These psychological benefits were the primary reasons they continued to run. Unfortunately, no exact and detailed statistics concerning the reasons was given; this further limits the study.

Clough, Shepherd and Maughan (1988) compared reasons for running between social classes, namely, as phrased by themselves, between 'blue' and 'white' collar workers. Their research originated from a postulation made by Snyder and Spreitzer (cited in Clough et al. 1988) that sports are used by middle and upper class individuals as a means for attaining psychological self-development. Consequently, questionnaires were sent to 518 runners who participated in the Aberdeen Milk Marathon in the UK in 1985. Of the 399 respondents, indicating a 88% response rate, 87 were 'blue' collar and 312 were 'white' collar, or from a lower socio-economic class and middle or upper socio-economic class respectively. Due to the imbalance of the sampling groups, it is difficult to make accurate deductions concerning the groups' differences or lack thereof regarding their motives for running. Moreover, Clough et al. did not disclose the details of their questionnaire nor exact statistics of the findings, limiting the study. However, the main reasons given by both groups for starting to run were to improve health and improve fitness, which may be classified as physical health reasons. Unfortunately, no mention was made of psychological reasons or reasons for adherence.

Morgan, O'Connor, Ellickson and Bradley (1988) wanted to test a number of hypotheses, one being that elite runners' involvement in and adherence to running is governed by intrinsic motivation. In this study, elite runners are those who had competed internationally. They interviewed 14 elite American male distance runners. Intrinsic motivation may be defined as the "motivation of any behavior that is dependent on factors that are internal in origin" (Reber, 1985, p.373). This is further defined by Vallerand, Deci and Ryan (1987) who stated motivation in sport is referred to as intrinsic when one is attracted to the sport for direct experiential rewards such as a feeling of excitement or personal competence. Extrinsic motivation, on the contrary, is "motivation that originates in factors outside of the individual" (Reber, 1985, p.262). Examples of extrinsic motivation include winning trophies, prizes and receiving acknowledgement. According to Singer (1977), both forms of motivation probably operate together in many situations, with one the more dominant of the two. In other words, while one individual may be motivated to play sport because of the sense of fulfillment it gives rather than for the acknowledgement of others, the opposite may hold true for another individual. Moreover, Singer postulated that intrinsic motivation rather than extrinsic motivation encourages greater persistence at an activity.

The 14 runners who were interviewed in the Morgan et al. (1988) study were asked to explain in 25 words or less why they became involved in running. Their responses were then classified as either intrinsic or extrinsic. They were also asked to explain in 25 words or less why they continued to run. Once again, their responses were then classified as either intrinsic or extrinsic. Because the sample was so small, it cannot be considered as representative of elite distance runners. The interview as a method of obtaining information has advantages and disadvantages.

According to Kerlinger (1986, p.440), "it has important qualities that objective tests and scales and behavioral observations do not possess". When it is well-structured, much information may be obtained from it. Furthermore, as a flexible tool it can be adapted to individual situations. Kerlinger also states that the interview is further advantaged because the interviewer can probe answers to questions. However, the interview method could be disadvantaged if it is not carefully structured as the interviewee may misinterpret the questions. Furthermore, if the interviewer is not skilled, responses to questions could be misinterpreted or be interpreted subjectively. In this particular study, the interviewees, in being limited to 25 words, were not left free to express their reasons fully. According to the findings, 93% became involved in running for intrinsic reasons. The results did not indicate the strength of extrinsic reasons for initial involvement. One hundred percent of the runners remained in the sport for intrinsic reasons. Some did have extrinsic reasons for adherence, but these were secondary to the intrinsic reasons. The relative strength of these extrinsic reasons was not detailed. A further limitation is that more specific detail about the intrinsic motivations was not given.

Another study which employed the interview as a means of obtaining information concerning motives for participation was conducted by Schnabel, Hilmer, Roder and Lehri (1988). Three hundred and forty-three marathon runners and 293 triathletes from USA were interviewed. Of the interviewees, 47% were motivated to participate because of 'an urge to move', 46% for health promotion, 39% for self-assertion, 37% for a reduction of stress and 19% for a feeling of euphoria. While the motive of health promotion may be categorized as a physical health reason, the motives of self-assertion, stress reduction and euphoria are chiefly psychological. The motive, 'an urge to move' is very

ambiguous. At first, it may appear to be purely a physical motive. However, when one considers the psychological withdrawal symptoms runners experience when unable to run, it could be classified as a psychological motive. Psychological withdrawal symptoms will be discussed in 2.3. No differences were found between the marathoners and triathletes. This may be due to the fact that both are endurance sports and triathlons also involve running. Unfortunately, reasons for initial involvement were not asked for. From the findings, one can conclude that physical health reasons and psychological reasons play an important role in motivating one to continue participating in endurance sports.

As part of a study concerned with various aspects of marathon running, Barnell, Chamberlain, Evans, Holt and Mackean (1989) interviewed 24 British runners. The spouses or partners of 17 of the runners were also interviewed. The interviews, which lasted an hour or more, explored, in depth, the interviewees' degree of involvement as well as their motives for running and participating in a marathon. Initially two complementary methodological approaches were used in the project. In the first phase self-report questionnaires were administered to 1 436 runners. Unfortunately no further details about the questionnaire were given. Barnell et al. used this initial data to select a sub-sample of respondents, who were interviewed. Once again, no details regarding the selection were given, limiting the study. The interviews were very flexible and open-ended as the runners were prompted to talk as much as possible. This may be viewed as a strength. However, the interpretation of the data could have been influenced by the interviewers' subjectivity.

Data from the Barnell et al. (1989) study suggest that the interaction of a number of physical, psychological and social factors is responsible for a person's initial involvement in running.

According to the results, the majority of male and female runners referred to a complex set of motivations and circumstances to account for this initial involvement. Most became involved in running to keep fit and improve their health and well-being. Running seemed a possibility because of its flexibility; it is not bound by team arrangements and specific venues and one can do it when it is convenient. For many, running tended to rise out of critical phases in their lives as it prompted an appraisal of past and current lifestyles, and these interviewees felt they needed a challenge, which running could give. Many, however, needed a strong social base to motivate them to run. Although running proved to be very satisfying initially, many still experienced it as hard and demanding during their initial involvement.

The reasons for continued participation were complex and varied. Many of the interviewees experienced a sense of freedom and relaxation when running. Some perceived running as a compensation for routine jobs. Running also gave the interviewees their 'own time' as they could escape from others and enjoy a sense of privacy when running. Many claimed that they were motivated by the 'challenge' of running. According to Barnell et al., the word 'challenge' appeared to be common in the vocabulary of motives. On analysis it referred to achievements such as completing difficult races and beating one's personal best time. There is an obvious similarity between 'challenge' and Carmack and Martens' (1979) goal achievement. Unfortunately, exact statistics concerning the various motivations are not detailed; this limits the study. One may conclude that, except for the inclusion of soical motivations, the Barnell et al. findings are in accordance with other studies previously discussed. It is possible that the in-depth open-ended interview allowed this extra dimension to be revealed.

Contrary to the findings of Barnell et al. (1989) that social forces motivated one to run are those of Yair (1990). The purpose of Yair's study was to test the concept of commitment and identify forces conducive to participation. Commitment, defined by Yair, is a "behaviour that continues over a long period of time and involves the giving up of other alternatives, willingly or otherwise" (1990, p.215). Like motivation, it is a tendency to carry out a particular set of behaviours (Weinberg, 1984; Howe, 1986). In order to achieve the purpose of the study, questionnaires were mailed to the 250 runners who ran in the Israeli International Marathon in 1986. The same questionnaire was also sent to the 500 readers of the Hebrew bi-monthly, *The World of Running* magazine. Only 3 runners received questionnaires twice, namely from running the race and from reading the magazine. This group of 747 almost made up the entire competing running population in Israel in 1986. The findings of the Yair (1990) study identified five factors of commitment or motivation. The first factor, identification with running or associating oneself with the sport had the greatest motivating role. The second factor was the moral obligation of the runner to him/herself as a runner. Those motivated by this factor would feel duty-bound to run because as runners they are supposed to run. Yair listed the third factor as existential rewards, such as fulfillment. He also stated, under this factor, that running allows one to order one's life. The need to achieve was identified as the fourth factor. The fifth factor, the need to be seen by others, may be viewed as a social force. According to Yair this factor has little bearing on the individual who runs. Most of the time one runs alone and therefore, the runner's own identification with running spurs one on. Unfortunately, no exact statistics concerning the strength of the five factors was detailed. However, it is evident that these factors may be classified as largely psychological. A further limitation of the study is that

reasons for initial involvement were not assessed. Thus, the role of any possible physical health motivation or commitment is not known.

Chan and Lai (1990), in a study designed to determine, inter alia, running habits and the perceived psychological benefits of the sport, also assessed reasons for starting to run. Forty-four male distance runners from Hong Kong completed a questionnaire. Results show that 63,5% of the sample started to run to improve physical fitness, 56,8% for enjoyment, 54,5% to compete in races, 36,4% to improve mental health, 31,8% to control body weight, 15,9% to replace previously played sports and 4,5% to treat physical illness. It, thus, appears that physical health reasons played a predominant role in initial involvement. Psychological reasons, although to a lesser extent, also motivated initial involvement. These findings support the findings of the previous studies discussed. Unfortunately, reasons for adherence to the sport were not determined. Furthermore, the small sample limits the generalizability of the study.

After careful analysis of the studies outlined in the foregoing pages, one may deduce that physical health is the primary reason for people's initial involvement in running. Although with continued participation physical health remains an important motivating factor, psychological reasons become paramount. To understand fully the importance of these psychological reasons, perceived positive psychological benefits associated with running must be considered. A detailed examination of these benefits will be attempted in the following section.

2.2 Perceived Psychological Benefits of Distance Running

Motivation for participation is directly associated with the benefits of running. It is possible that a runner may continue to run because of the benefits experienced from the sport, be they perceived and/or real, physical and/or psychological. The majority of studies which have focused on the psychological aspects of distance running have concentrated on the emotional and mental benefits associated with the sport. These will be discussed in depth in this section. As with the previous section, the studies will be considered in chronological sequence. However, as the methodologies of some of the studies have already been dealt with, it will not be necessary to repeat them.

Kostrubala (1976) in *The Joy of Running* reported claims of benefits from runners whom he came into contact with. One runner, after running for a few weeks, stated, "Now when I came home to Ann, I was bright and fresh and eager to do things ... I seemed to be more cheerful. Running gave us more energy" (Kostrubala, 1976, p.39). Another runner claimed that because of running he was less depressed and after 45 minutes of running was "incapable of putting together that mosaic of misery" (Kostrubala, 1976, p.40). Kostrubala feels that running is psychologically beneficial as it brings to the fore each runner's individuality because in the final analysis each runner is alone; an individual testing and finding him/herself. Kostrubala's claims cannot be viewed as reliable because he did not conduct a scientific study and as stated by Carmack and Martens (1979), his claims may be introspective and subjective.

Folkins (1976) conducted a study to assess whether anxiety, depression, self-confidence and personal adjustment were affected by running. Forty Californian males between the ages of 40 and 58

years, and who were high-risk coronary patients were identified. They were assigned to an exercise or control group. Both groups were matched in respect of age, occupation and risk factors. The exercise group ran three times a week for 12 weeks while the control group did not alter their exercise routine. Physical and psychological tests were conducted before and at the end of the twelve weeks. The exercise group, as measured by the Multiple Affect Adjective Checklist, a self-report measure, showed significant decreases in anxiety and depression. Furthermore, they also reported that they felt happier and better since exercising. According to Folkins, the data from other tests conducted on the exercise group, which unfortunately were not detailed, were in accordance with the findings already detailed. The control group showed no significant change on any of the psychological variables before and at the end of 12 weeks. Because this study was conducted with high risk coronary patients it could be unrepresentative of the general population of runners.

The purpose of an investigation by Brown, Ramirez and Taub (1978) was to determine if exercise had any effect on various psychological traits such as moods, of normal and depressed subjects. The study was conducted in two phases. In the first phase, 167 subjects from schools in USA had to choose one of the following forms of exercise: running, softball, tennis or wrestling. For 10 weeks all subjects were required to participate in their chosen exercise three times a week for 30 minutes. At the outset and end of the 10 weeks all the subjects completed the Zung Depression Scale, Eysenck Personality Inventory and Human Figure Drawings test. Furthermore, they were required to keep a journal in which they recorded their moods. No subject was on medication and thus, this would not account for any mood changes. The results of this phase showed that the depression of the subjects involved in running, tennis and wrestling was lower after the 10

week exercise period. There were no changes in the softball group. This first phase has many shortcomings. Firstly, there was no control group who did not exercise during the 10 week period. Secondly, changes as regards the subjects' depression, as measured by the Zung Depression Scale, are given, but the results of the other measures are not detailed. Finally, there were no significantly depressed people in any of the groups. Thus, the question as to whether exercise could help alleviate the depression of such individuals remains unanswered. The purpose of the Brown et al. study was not accomplished.

In order to validate the results of the first phase of their study and to correct the limitations of it, Brown et al. (1978) introduced a second phase to this study. The subjects were 561 American university students . They completed the Minnesota Multiphasic Personality Inventory Scale, the Activation-Deactivation Adjective Checklist, another multi-factor adjective checklist as well as questionnaires dealing with sleep and health. On the basis of these results four groups were formed. Of the 101 significantly depressed subjects, 91 were assigned to an exercise program and 10 formed the control group. Of the remaining subjects who did not suffer significantly from depression, 406 exercised and 54 served as the control group. The procedure which followed was the same as that of the first phase, namely subjects who were in the exercise groups chose to run, wrestle, play tennis or softball. Unfortunately, the number of subjects in each of these exercise groups was not given.

Results of the second phase of the Brown et al. study (1978) showed that all the groups who exercised experienced a reduction in depression in comparison to the pre-exercise group. These results, although similar, are a little different to those of the first phase: The softball group also experienced a reduction in

depression and the runners experienced the greatest reduction in depression. One may ask if these differences were due to the different testing measures used in the two phases. It is unfortunate that the same measures were not used in both phases. Responses to the adjective checklist showed that all the exercise groups experienced less anger, hostility, fatigue, inertia, tension and anxiety. Furthermore, the exercise groups were more cheerful and energetic after the 10 week period than before it. The control groups experienced no mood changes. Consequently, Brown et al. recommended that psychotherapeutic treatment should include exercise. The results also indicated that the very depressed subjects chose the most vigourous forms of exercise. Brown et al. did not disclose procedures or further details about this; this may be viewed as a limitation.

Carmack and Martens (1979), discussed in the previous section, requested that their sample of 315 American runners list any benefits they derived from running. This sample, as discussed in 2.1, was representative of runners in USA. The five most frequent answers given were an improved feeling (96%), cardiovascular endurance (94%), a challenge (89%), relief of tension (88%) and a general increase in energy (85%). The answers given were classified into five categories, namely physical health, psychological upliftment, self-image, affiliation and achievement. On analyzing the five most frequent answers given, 'cardiovascular endurance' may be classified as a physical health benefit, whereas 'relief of tension' may be classified as psychological upliftment. It is unclear, however, if 'improved feeling' and 'challenge' are physical and/or psychological benefits. Although increased energy may be viewed as a physical health benefit, it has psychological implications too. This vagueness as well as the fact that the proportion of respondents in each category was not detailed, limits the study.

One of the major focuses of the Carmack and Martens (1979) study was the development of an instrument to measure one's commitment to running. Runners who had a high commitment to running had experienced more benefits than those with a lower commitment. This suggests that those runners with a higher commitment derive more benefits from the sport than those with a lower commitment. One may assume that commitment to running and benefits exert an influence on each other. This is similar to the view expressed by Glasser (1976) that runners become "positively addicted" to running because of the beneficial psychological effects.

Cole (1980) compared women runners to women non-runners. Twenty-five women who completed the Boston Marathon were interviewed. Cole compared the data which she obtained from the interviews with data on non-runners. She did not interview the non-runners, but was supplied with the relevant data. No further details about these non-runners were given. One does not know how many there were, how the data were obtained and if these non-runners matched the runners with regard to age, occupation and such. Thus, the validity of this study is questionable. Results do, however, indicate that the runners had greater job satisfaction, lower anxiety levels, a greater ability to cope with problems and more positive body images than the non-runners. According to Cole, these results imply that running may enhance self-esteem and reduce stress. This is a valid assumption as runners attributed these positive aspects to their involvement with running.

Wilson, Morley and Bird (1980) attempted to determine if the benefits one derives from exercise is in proportion to the amount of exercise one does. In other words, will twice as much exercise result in twice the intensity of the benefits derived? Thirty males from a metropolitan city in USA, between the ages of

20 and 45 years, were the subjects. They all completed McNair, Lorr and Droppleman's (cited in Morgan & Pollock, 1972) Profile of Mood States. This is a 65-item adjective rating scale designed to assess six mood states, namely tension, depression, anger, vigour, fatigue and confusion. According to Hassmen and Blomstrand (1991), McNair, Lair and Droppelman stated that the reliability coefficients for the six scales are depression 0,74, anger 0,71, tension 0,7, confusion 0,68, fatigue 0,66 and vigour 0,65. Unfortunately, no detail regarding the type of reliability coefficient was detailed. Of the 30 subjects, 10 were marathoners who had run competitively for two years, and ran between 10 and 32 kms for six days of the week. Ten of the subjects could be classified as joggers or casual runners who had participated in the sport for two years for exercise purposes. They ran between 1,6 and 3,2 kms for three to five days of the week. The other 10 subjects were non-exercisers. Although the sample was small, it included different degrees of interest and participation.

Results showed that the marathoners and joggers experienced less depression, less anger, less confusion, less fatigue, less tension and more vigour than the non-exercisers. The marathoners and joggers did not differ as regards measures of fatigue and tension. However, the marathoners were less depressed, less angry, less confused and more vigorous than the joggers. One may deduce that the marathoners had the most positive mood states of the three groups. Wilson et al. (1980) not only confirmed the findings of previous studies concerning the psychological benefits of running, but added another dimension, namely that more exercise may result in more benefit. However, one may ask if the extra benefit was related to the extra training, the type of individual attracted to more strenuous exercise or to an

expectation of positive benefits. This, unfortunately, was not determined.

Harris (1981a), whose study has been outlined in 2.1, assessed if runners experienced any psychological benefits from running. The sample did not report any specific behavioural changes, but evidently led a healthier lifestyle, eating more nutritious food, drinking less alcohol and sleeping better than before they started to run. However, the following data were obtained from those who stopped running, either out of choice or due to forced circumstances: 3,5% felt better, 3,5% had more energy, 1,3% experienced other positive feelings, which were not specified, while 8,5% experienced no change in feelings. However, 56,8% were less energetic, 43,5% felt guilty, 23,7% were depressed and 12,4% experienced other negative thoughts, which were not detailed. Although the runners did not notice any behavioural changes which they could attribute to running, most experienced negative psychological consequences when they did not run. One may conclude, then, that most of the runners did derive psychological benefits because of participation. However, the question may be asked if these benefits were due to their reported changed healthier lifestyle, running or both. It is difficult to make deductions because the percentage of the sample who no longer ran was not given, limiting the study.

Harris (1981b), also discussed in 2.1, determined what changes her sample of American women experienced as a result of running. Although most reported that because of running they felt stronger, happier, more relaxed, better about themselves, more attractive, more feminine and more energetic, one may question what percentage of the sample 'most' means. Furthermore, as the sample also reported that since they had started to run they had eaten nutritional food and had reduced their intake of alcohol,

one may, again, ask if the benefits were due to these factors, running or both. The sample was also asked to respond to, "Do you think running has been positive for you?" on a 7-point scale. The weighted mean for this question was 6,7. Although running, then, had a very positive connotation for them, it is possible that dietary factors could have influenced their responses indirectly. When unable to run, 90% reported that they were less energetic, depressed and tense. Harris' study has limitations, but one may conclude that runners do experience positive psychological benefits because of running.

Percy, Dziuban and Martin (1981) assessed the effects of a systematic running program on the self-concepts of fifth and sixth grade pupils in an American public school. Thirty subjects were chosen randomly from 110 children. Of the 30, 15 were randomly assigned to an experimental group and 15 to a control group. Each subject in the experimental group ran at least 1,6 kms three times a week for a period of seven weeks. At the outset and at the end of the seven week period both groups completed the Coopersmith Self-Esteem Inventory. Everyone in the running group showed a marked increase in self-concept at the end of the said period in comparison to that recorded before the seven week period. There was no change in the self-concepts of the control group. One may conclude that due to running one may develop a more positive self-image. However, the subjects were under the age of thirteen and were not running long distances. One may question if these results could be generalized to the long-distance running. In this regard the findings of Wilson, Morley and Bird (1980), that more exercise may result in more benefit, could lead one to suggest that the findings of Percy et al. (1981) could be applicable to long-distance runners.

Gondola and Tuckman (1982) wanted to determine whether 'average' marathoners, that is, those men and women marathon runners who were not classified as elite or world-class marathoners, also experienced a positive psychological mood because of running. Hence, participants who were waiting in registration lines in the 1981 New York City Marathon were asked to complete McNair, Lorr and Droppleman's Profile of Mood States (POMS) and a background questionnaire. Sixty-eight females and 280 males agreed to participate. The men in the sample averaged 32 years of age, ran an average of 104 km a week and had an average marathon time of 3 hours 30 minutes. The women in the sample had an average age of 34 years, ran approximately 85 km a week and had an average marathon time of 3 hours 57 minutes. Based on the average marathon time one may deduce that those sampled were not elite, but 'average' runners.

Gondola and Tuckman (1982) reported that they used the Profile of Mood States because they considered it easy to administer. Moreover, they reported that it had been standardized on a sample of 340 male and 516 female undergraduate college students from a large university in the east of the USA. The results obtained from the sample of 'average' marathoners were compared to the standardized results of the college students. The results showed that the marathoners were significantly less tense, less fatigued, less depressed and less confused than the college students ($p < ,001$). The marathoners were also significantly more vigourous than the college students ($p < ,001$). However, there were no significant differences between the scores of the marathoners and the college students on the measure of anger. Gondola and Tuckman (1982) concluded that there is a strong relationship between positive mood states and long-distance running.

Zarski, West and Bubenzer (1982) tested two assumptions. Their first assumption was that running stabilized the positive aspects of one's personality, contributed a sense of increased confidence and self-esteem and thus, resulted in greater life adjustment. Their second assumption was that social interest was an evaluative attitude toward life, was expressed through empathic understanding, enabled a person to identify and form ties with the group and resulted in improved mental health and greater life adjustment. They advanced three hypotheses. Their first hypothesis was that runners would report greater life adjustment than non-runners would. Their second hypothesis was that high social interest persons would report greater life adjustment than low social interest persons would. Finally, they hypothesized that there would be a greater difference in the scores on the measure of life adjustment between high social interest runners and low social interest non-runners than between low social interest runners and high social interest non-runners.

The sample in the Zarski et al. (1982) study comprised 308 subjects. Of these 161 were runners and 147 non-runners. The test battery consisted of the Social Interest Inventory (SII) and the Bell Adjustment Inventory (BELL). The runners completed the instruments two hours prior to a 10 000 m track race. The non-runners consisted of observers present at the race, students enrolled in undergraduate and graduate programs during the 1980-1981 academic year and interested volunteers. In order to test the hypotheses, the sample was divided into high social interest scores and low social interest scores on the basis of total mean SII scores for the whole sample.

Results of the Zarski et al. (1982) study indicated that runners had higher life adjustment scores than non-runners. Furthermore, high social interest persons had higher life adjustment scores

than low social interest persons. Zarski et al. (1982) concluded that both their first and second hypotheses were supported by the data. However, the third hypothesis was rejected. High social interest runners did not report the greatest life adjustment among the four groups. The findings indicated that although high social interest runners had greater life adjustment than low social interest non-runners, high social interest non-runners had comparable life adjustment scores to low social interest runners.

One of the major purposes of Callen's (1983b) study was to determine the mental and emotional benefits derived from running. As the methodology of this study was detailed in 2.1, it is sufficient to state that the sample was representative of runners from USA. The respondents of the questionnaires listed any benefits they experienced as a result of running. Of the sample, 96% noticed mental and/or emotional benefits attributable to running. More specifically, 86% experienced a relief of tension, 77% a better self-image, 75% more relaxation, 66% improved mood, 64% greater self-confidence, 58% greater happiness, 58% more alertness, 56% reduced depression, 53% greater contentment, 53% an improved outlook on life, 53% clarity of thought and 24% more aggression. There was little difference between age-groups in terms of these perceived benefits. There were a few significant differences between men and women ($p < ,05$). Of the male respondents, 62% experienced improved moods, while 74% of female respondents reported this benefit. Fifty-two percent of the male respondents compared to 69% of the female respondents experienced less depression. Greater contentment was reported by 57% of the male respondents and 46% of the female respondents. There is no explanation for these differences. From the results one may conclude that runners believe that they derive psychological benefits from their sport.

Summers, Machin and Sargent (1983), in their study which has been discussed in 2.1, also determined what outcomes or benefits runners derived from running. The respondents to the questionnaire, who were representative of the Australian road running population, were given a list of 40 possible outcomes. They were requested to list the applicable ones. The five outcomes which were responded to most frequently were physical fitness (98%), a feeling of achievement (96%), provision of a challenge (90%), an improved feeling (86%) and enjoyment (86%). The 40 possible outcomes were grouped into five categories. The categories and percentage of responses for each were achievement (76%), physical health (63%), psychological health (53%), self-image (46%) and affiliation (39%). Success and the provision of a challenge were categorized as achievement. Unfortunately, no details concerning the other categories are given. One may question what exactly psychological health is. One may be justified in assuming that achievement and self-image are part of and/or influence psychological health. However, physical fitness may also influence psychological health. People are holistic beings: According to Adler (cited in Zarski et al. 1982), there is a reciprocal action of the mind on the body and of the body on the mind. This view was also expressed by Bloomfield and Kory (1978) and Folkins and Sime (1981).

The only significant difference found between the sexes was affiliation. Running brought 48% of the female respondents and 36% of the male respondents into close contact with others ($p < ,01$). This finding was consistent with their training habits as 41% of the female respondents trained with others and only 26% of the male respondents did ($p < ,005$). This finding is consistent with that of Harris (1981a) who found that females continue to run because their friends do. Although no significant differences appeared across age-groups, more emphasis

was placed on affiliation by the 14-20 year age group (52%) in comparison to the older age groups (35%). While there is no logical explanation for this difference, Gill, Gross and Huddleston (1983), Gould, Feltz and Weiss (1985), Wankel and Kriesel (1985a) and Stern, Bradley, Prince and Stroh (1990) found that social reinforcement or affiliation was one of the primary motives children participated in sport. One may conclude that the findings of this study support previous studies, namely that runners experience physical and psychological benefits from running.

Gondola and Tuckman (1983) administered the Profile of Mood States (POMS) to 464 women runners. Sixty-eight of the subjects were marathoners, 210 were 10 km runners and 186 casual runners. Thus, their training habits varied. Findings showed that those runners who averaged 40 km a week recorded more positive profiles on the POMS than those who ran in excess of 80 km or less than 20 km a week. This finding appears to be contrary to the findings of the Wilson et al. (1980) study which deduced that the benefits derived from exercise were in proportion to the amount of exercise one does. However, in their study no-one ran more than 32 km a week. Thus, their findings do not contradict, but partially confirm the findings of Gondola and Tuckman.

In a study conducted by Kostrubala (1986), 65 women who ran at least one marathon completed the Myer-Briggs Type Indicator, a demographic survey and open-ended questions concerning their perceived benefits of running. Supporting the other studies discussed in this section, they reported that running had decreased their anxiety, depression, frustration and anger, and had improved their health, sensuality and creative thinking.

Two of the questions Estok and Rudy (1987) attempted to answer in their study were, "Is there a difference in the self-reported level of anxiety and self-esteem in male and female runners?" and "Is there a difference in the self-reported level of self-esteem in male and female runners?" Questionnaires were sent to 488 runners who participated in the Ohio Marathon in USA. There was a 45% response rate. The sample comprised 112 women and 108 men. In general, there are many more males than females who are involved in long-distance running. Hence, there are usually more male respondents than female respondents. This sample was unusual in this sense. The respondents' ages ranged between 18 and 69 years, with a mean age of 34. Even though, compared to other studies, there were unusually more females than males in the sample, it was, according to Estok and Rudy, representative of American marathon runners. The questionnaire used in the study was developed by modifying Rosenberg's Self-Esteem Scale and Zuckerman's Anxiety Checklist. Results showed that male and female runners scored similarly on self-reported levels of anxiety and self-esteem. According to the respondents, they experienced low anxiety and positive self-esteem because of running. These findings support those of Callen (1983b) and Summers et al. (1983).

Rape (1987) examined the relationship between running and depression among 'normal' people. 'Normal', in this sense, refers to people who were not diagnosed, with the use of the Beck Depression Inventory, as suffering from depression. The primary purpose of Rape's study was to assess if runners were significantly less depressed than non-exercisers. Twenty-one men who averaged 24 kms or more a week and 21 men who did not exercise formed the experimental and control group respectively. All subjects were Caucasian, formed part of a small community in Western Pennsylvania and were between the ages of 18 and 25. No

details regarding how the subjects were obtained was given. Unfortunately, no details concerning the runners' running habits were given. All subjects completed the Beck Depression Inventory. Findings showed that the runners were significantly less depressed than the non-exercisers.

The purpose of Dyer and Crouch's (1987) study was two-fold. Firstly, they wished to compare mood variations in runners of differing abilities and who had different commitments to the sport. Secondly, they wanted to determine if and when runners' moods varied. Fifty-nine American undergraduates, between 18 and 24 years of age were divided into three groups. The control group was formed by 19 non-exercisers. The second group consisted of 20 beginner runners or joggers, who had run for five months and averaged 30 minutes of running three times a week. The third group consisted of 20 advanced runners who ran 90km a week. Thus, commitment differed across the three groups. The subjects completed a questionnaire concerning their running habits, Carmack and Martens' (1987) Commitment to Running Scale and the Profile of Mood States. The latter measure was completed once by the control group and four times by the running groups, namely 3 hours before, 10 minutes before, 10 minutes after and 3 hours after running.

Findings in the Dyer and Crouch (1987) study showed that running groups' moods were significantly more positive than the non-exercisers. However, the running groups cannot be compared to the control group as the latter group only completed the POMS once in comparison to four times by the experimental groups. Results also indicated that the beginner and advanced runners' mood profiles did not differ. This finding is in contrast to that of Wilson, Morley and Bird (1980) who found that more

exercise may result in more psychological benefit. A further finding of the Dyer and Crouch study was that the moods of the running groups was significantly more positive after running than before. Although one would expect the anticipation of running to have a positive effect on moods, the runners were more tense, depressed, confused and angry before running than after it. Unfortunately, the differences, if any, between 10 minutes and 3 hours before, and 10 minutes and 3 hours after was not indicated. It has been suggested by Dyer and Crouch that as the news media have emphasized the positive effects of exercise, runners may be influenced to view themselves to have more positive moods after running, but need not have. This, however, may not be the case. The runners' subjective perception, as reflected in POMS, may not necessarily be influenced by the news media. Their positive moods may be an accurate reflection of the influence running has on their lives.

In another study, Dyer and Crouch (1988) compared the moods of runners, aerobic dancers, weight-lifters and a non-exercising control group. Unfortunately, no details regarding the subjects were given. Each group completed the Profile of Mood States. The profiles of the runners and aerobic dancers were similar, but somewhat more positive than the non-exercisers. One may deduce that not only running, but other forms of aerobic exercise are beneficial psychologically.

One of the purposes of a study by Tharion, Strowmer and Rauch (1988) was to determine how the mood state of ultramarathoners differed before and after an ultramarathon. They also wished to determine if there was a difference in the mood states between finishers and non-finishers of the ultramarathon. Subjects were entrants in the 1986 Massanutten Mountain Massacre Trail Run, which was 80km and the 1986 Old Dominion 160 km Cross Country

Endurance Run. Both races were held in Virginia, USA. Of the 118 registered runners in both races, 56 males agreed to participate in the study. Their average age was 36,25 years and on average they had had eight years running experience. Tharion et al. did not state how representative their sample was of ultra-marathoners in USA.

The participants completed McNair, Lorr and Droppleman's Profile of Mood States 12 hours prior to the race and within one hour of either completing the race or voluntarily withdrawing from the race or being removed from the race because of medical reasons. Of the 56 participants there were 17 finishers and 17 non-finishers in the 160 km race. Results showed that both finishers and non-finishers were more depressed, more confused and experienced more fatigue after the race than prior to it. Finishers and non-finishers were less tense and less vigourous after the race than before it. There was no difference in the anger scale before and after the race. Although finishers reported greater fatigue than non-finishers at the end of the race, there were no other significant differences between the two groups. These findings of Tharion et al. (1988) are in contrast to those of Wilson, Morley and Bird (1980), but in agreement with those of Gondola and Tuckman (1983). One may conclude that exercise does enhance one's moods, but that too much exercise may have the opposite effect.

Ungerleider, Golding and Porter (1989) administered the Profile of Mood States to 587 Master track and field athletes in USA. In the USA, Master athletes refers to those athletes over the age of 30. Findings indicated that these athletes had very positive mood profiles. Their mood profiles were compared to those of 340 male and 516 female college students. These college students were

also used as a basis for comparison in the Gondola and Tuckman (1982) study, which has been previously discussed in this section. According to Ungerleider et al., the student group was different from the Master athletes because college students tend to be non-exercisers and are hence, a good comparison group. The mood profiles of the Master athletes were also compared to the 280 male marathon participants of the Gondola and Tuckman (1983) study. Findings showed that the Master athletes were less tense, less depressed, less angry, less fatigued and less confused than the marathoners and college sample. There were no significant differences on the vigour scale and confusion scale between the Master athletes and marathoners. Both groups were more vigourous and were less confused than the college sample. Ungerleider et al. stated that the Master athletes' more positive mood profile might be a result of maturity with age. However, this may not be the case. The marathoners averaged between 85 km and 104 km a week while the Master athletes ran approximately 48 km a week. This may suggest that more exercise need not result in more psychological benefit. This assumption is contrary to the findings of Wilson, Morley and Bird (1980), but offers some measures of support to the findings of Tharion, Strowmer and Rauch (1988).

One of the major purposes of Chan and Lai's (1990) study was to assess mental and emotional benefits derived from running. This study was detailed in 2.1. The respondents reported the following 15 benefits attributable to running: better physical health (72,9%), greater self-confidence (59,1%), greater happiness (56,8%), greater relaxation (54,5%), improved mood (50%), improved alertness (47,7%), relief of tension (45,5%), improved work performance (43,2%), more positive self-image (36,4%), relief of depression (36,4%), greater aggression (36,4%), improved outlook (34,1%), greater contentment (31,8%), clarity of

thought (31,8%) and better family relationships (15,9%). On analysis, it will be noticed that these findings are similar to those of Callen (1983b). The benefits listed in both studies are the same even though the strength attributed to these benefits differ slightly.

The purpose of a study conducted by Williams, Krahenbuhl and Morgan (1991) was to determine the relationship between the psychological moods of moderately trained male runners, as measured by the Profile of Mood States, and their running economy. Running Economy was determined by the runners' oxygen consumption, generally referred to as VO . Ten runners, between the ages of 20 and 34, were monitored during treadmill running from Monday to Friday for four weeks. Each Friday, prior to their running session, each runner completed the POMS. Results showed that those runners who had more economical values or a better running economy had more positive mood profiles. This study is limited because of its small sample. One may also question whether running on a treadmill has the identical effects to running on the road. As yet, no studies have been conducted to determine this.

The major focus of a study by Hassmen and Blomstrand (1991) was to assess the short-term influence of running a marathon on participants' mood states. Two days before the 1989 Stockholm Marathon, at the assignment of race numbers to participants, 120 males volunteered to take part in the study. To participate the runners had to aim to finish the marathon between 3 hours and 3 hours 45 minutes. Volunteers had to go to the laboratory 2 hours before the race, to complete McNair, Lorr and Droppleman's Profile of Mood States. Of the 120 volunteers, 24 were randomly selected to give a blood sample for analysis of plasma glucose concentration. As soon as possible after completing the race,

volunteers were required to return to the laboratory to complete the POMS and those who had given blood samples were required to do so again. Runners were divided into three groups when they had finished the race. The 'Fast' group consisted of those who had run the marathon between 3 hours and 3 hours 15 minutes, the 'Medium' group of those who had run it between 3 hours 15 minutes and 3 hours 30 minutes, and the 'Slow' group of those who run it between 3 hours 30 minutes and 3 hours 45 minutes. The original group of 120 was reduced to 106. The other 14 had not completed the race within the stipulated time. The 24 who had given blood samples were reduced to 18.

The results of the Hassmen and Blomstrand (1991) study for the pre-race and post-race scores on the POMS test are as follows: There were great similarities between the groups in that all groups showed significant decreases in tension and vigour as well as an increase in fatigue when the pre-race and post-race scores were compared. The 'Fast' and 'Medium' groups experienced no changes in depression at the two testings while the 'Slow' group were more depressed at the end of the race than at the beginning of it. The anger of the 'Fast' and 'Medium' groups was less at the end of the race than prior to it, while the 'Slow' group experienced the same amount of anger at both testings. The 'Fast' and 'Slow' groups were more confused at the end of the race than at the beginning, while the 'Medium' group remained the same. Hassmen and Blomstrand offered no possible explanation for these differences. One may question if the three groups were significantly different from one another when one considers their times. One may ask whether, for example, there is a significant difference between 3 hours ("Fast" group) and 3 hours 15 minutes ("Medium" group). One may question what mood profiles elite runners, such as those who run marathons in 2 hours 10 minutes, and very slow runners, such as those who run marathons

in 5 hours, experience. One may question whether differences would have been found if Haasmen and Blomstrand had included elite runners (2 hours 10 minutes) and very slow marathoners (5 hours) in their study. The findings of Hassmen and Blomstrand partially support the findings of Gondola and Tuckman (1983) and those of Tharion, Strowmer and Rauch (1988). The concentration of plasma glucose in 18 subjects at the beginning of the race did not differ statistically from the concentration of plasma glucose in these subjects at the end of it. Thus, any mood changes from pre-race to post-race on the POMS test could not be attributed to a decrease or increase in plasma glucose.

One of the purposes of a study by Ziegler (1991) was to determine the perceived benefits of running and attitudes towards running. One thousand entrants of the 1988 Revco Marathon received questionnaires. There were 402 respondents, indicating a 40,2% response rate. Most of the respondents were between 35 and 40 years of age. Of the 402 respondents, 300 were males, 58 females, and 44 did not state their gender. Furthermore, 313 rated themselves as competitive runners (CR) and 73 as recreational runners (RR) while 16 did not rate themselves. Recreational runners were defined as those who were committed to running, but whose focus was not to compete with others. Competitive runners were defined as those who were committed to running and whose main purpose was to finish as high as possible in their competitive age groups. The questionnaire given to runners was developed by Ziegler and known as "Survey for Marathon Runners". The questionnaire was piloted at the 1987 Revco Marathon, and then revised and shortened to overcome its shortcomings. The section on perceived benefits of running consisted of 40 Likert items. The section on attitudes towards running consisted of 25 Likert items.

The data of the Ziegler (1991) study was analysed by gender and classification of runners, namely the recreational and competitive runners. The recreational runners rated the benefits of competition, mental fitness and social recognition higher than the competitive runners. Competitive runners, however, looked forward to running more than the recreational runners. They also felt that 'running had made their lives richer', more so than the recreational runners. The competitive runners experienced less job stress and less personal stress because of running than the recreational runners did. The competitive runners attributed a positive self-image to running; the recreational runners did not.

Results of the Ziegler (1991) study also showed that males perceived a greater reduction in anxiety and a greater increase in their sense of identity because of running than females did. Males were also more energetic and experienced an improved muscle tone because of running. However, females did not have more energy or an improved muscle tone because of running. No detail of any other differences between males and females was given.

On considering the studies discussed in this section, it is evident that two methods of obtaining data have been employed. Firstly, data has been obtained by employing standardized tests, chiefly the Profile of Mood States and to a lesser extent, the Zung Depression Scale, the Coopersmith Self-Esteem Inventory, the Bell Adjustment Inventory and various adjective checklists. Secondly, data has also been obtained by employing self-report questionnaires. The emphases in various studies have also been different. However, it is clearly evident, regardless of the method employed and emphases of the studies, that runners do experience positive psychological benefits from running.

Why does running and other forms of aerobic exercise enhance psychological well-being? Although this problem is not the focus of this section, a brief overview of a few explanations will help to place the findings in perspective. According to Sachs (1984), there is no definite answer to the question. Rather, the benefits may be the result of a complex interplay of factors. Three of these factors are success experiences achieved through exercise, the distraction or consciousness alteration possibilities inherent in participating in vigorous physical activity as well as physiological and biochemical changes that occur as a result of exercise.

Griest, Klein, Eischens, Faris, Gurman and Morgan (1978) suggested that through running one masters the environment, allowing one to feel 'in control'. This feeling is then generalized to other areas of the runner's life. Griest et al. further speculated that any changes, be they physical, social or psychological, which may be experienced as a result of running, help teach runners that they have capacity for change and they are thus, 'in control'. These speculations may be similar to Sach's (1984) success experiences.

Morgan (1985) supported the distraction hypothesis by speculating that when one exercises, one concentrates on the exercise per se and not on any other stressful stimuli. It is, thus, not the exercise which causes an improved mood and other psychological benefits, but rather the distraction from stressful stimuli. Research is needed to confirm or reject this speculation.

Various explanations of a physiological nature have also been advanced. Vezina and Ruegger (1980) stated that certain biochemical substances such as cathecholamines and cholestrol levels undergo change in exercise. These biochemical changes produce

changes in behaviour. Cathecholamines are biologically active amines that have an effect on the peripheral and central nervous system. Cathecholamines, such as norepinephrine and serotin are, according to Morgan (1985), directly related to depression. People with lower levels of these amines are known to suffer from depression. As stated by Schildkraut, "Some, if not all, depressions are associated with an absolute or relative deficiency of catecholamine, particularly norepinephrine..." (1965, p.509). However, with exercise, levels of norepinephrine and serotin are known to increase, and thus, reduce depression. Ransford (1982) has pointed out that this explanation is speculative. Further research is required.

Ismail and Young (cited in Vezina and Ruegger, 1980) showed that there is a connection between high cholestrol levels and low super-ego strength, tension and emotional instability. According to Vezina and Ruegger, exercise lowers one's level of cholestrol. Once again, however, further research is needed to confirm or reject this explanation.

If running results in psychological benefits, are any of the consequences of the sport negative? Furthermore, if one accepts the various explanations offered, the following question may be raised, "What happens to one's psychological well-being when one is unable to run?" These questions will be addressed in the next section.

2.3 Negative Effects of Distance Running

Ulloyt (1976, p.10) in her book, *Women's running*, reports a

runner as saying:

> I'm always amused when non-runners express amazement at my daily running and admire my supposedly tremendous willpower, which enables me to drive myself so hard. Actually I have very little willpower and am basically a hedonist. I would not run if I didn't like it. In fact, if I take more than a few days off now, I have physical withdrawal symptoms like any addict ... headache, nervousness, insomnia and constipation. I plunge back into running with tremendous willpower and an exhilaration high.

Although subjective introspection, this statement captures the essence of this section, which is an attempt to detail and discuss the negative effects of running. Negative consequences of the sport may be classified as two-fold, which are best expressed in question form. Firstly, does involvement in the sport have any negative effects? Secondly, if running is positively beneficial, is a negative psychological state the result when one is unable to run? Although few, the studies which have focused on this will be dealt with in chronological sequence. Furthermore, the methodologies of those studies which have been previously discussed will not be repeated.

Baekeland (1970) had to abandon a study which was to determine what effects runners would encounter when unable to exercise for a period of time. Despite financial incentives, regular exercisers refused to participate stating that they refused to stop exercising regardless of the amount of money offered. This suggests that these runners were dependent on exercise. Unfortunately, the reasons why they refused to stop exercising were not assessed.

In order to explain the dependence described by Baekeland (1970), Morgan (1979) spoke of negative addiction. Morgan suggested that running is a wonder drug analogous to penicillin, morphine and the tricycles, as it has profound potential in preventing mental and physical disease as well as in rehabilitation. However, running also has potential for abuse. This is evident when a runner feels compelled to run at least once a day and if unable to do so, suffers various symptoms such as anxiety, depression, restlessness, insomnia and generalized fatigue. Sachs and Pargman (1979) stated that these withdrawal symptoms are most recognizable when the need to exercise remains unfulfilled after 24 to 36 hours. Furthermore, according to Morgan, runners who are negatively addicted arrange their daily schedules in order to meet the need to run, continue to run when injured and neglect the responsibilities of work, home and family. Morgan (1979) and Sachs and Pargman (1979) did not base their postulations on any scientific studies, but on their personal observations. Thus, in 1979 research was needed to either confirm or reject such statements. A negative addiction is in sharp contrast to a positive addiction. The latter term was first used in relation to running by Glasser (1976) in his book, *Positive Addiction*. According to Glasser, a positive addiction strengthens people, making their lives more satisfying. Thus, on considering the benefits of running, it is justifiable to view running as a positive addiction.

In their study, which has been discussed in 2.1 and 2.2, Carmack and Martens (1979) also determined how runners felt when a run was missed. Findings showed that 74% of the respondents experienced discomfort when a run was missed. The five specific feelings most frequently expressed by these subjects were guilt (19%), irritability, depression and negative mood (11%), concern about loss of training (10%), sluggishness or inertia (6%) and a

feeling of letting oneself down (4%). None of these percentages are very high, especially when one considers the high percentage of responses given to the positive outcomes of running, detailed in 2.2. This could be due to the fact that the respondents were requested to list any feelings they felt when only one run was missed, not many runs. Although speculation, it supports Sachs and Pargman's (1979) view. On the contrary, these negative feelings were in direct contrast to the positive psychological benefits derived. Unfortunately, no details concerning the other negative feelings were given. A further limitation is that Carmack and Martens did not request that the respondents list negative effects derived from running itself.

The purpose of a study by Robbins and Joseph (1980) was to investigate the connection between commitment to running and conflicts within one's family, marriage or personal relationships. The study was also an attempt to determine if commitment to running influenced one's working life. Various methods were employed to distribute questionnaires to a sample of American runners. Of the 568 questionnaires distributed, 354 were returned, a response rate of 62%. A section of the questionnaire determined each respondent's commitment to the sport. Results indicated a cross-section of levels of commitment. On the basis of this cross-section, Robbins and Joseph stated that their sample was representative of American runners. However, this deduction cannot be made without considering other demographic variables, such as age and occupation.

Robbins and Joseph (1980) found that direct conflict between the runner and his/her spouse over issues such as neglect, loss of shared interests and friends, fatigue and neglect of household chores was found to be consistently related to commitment to running. In other words, the greater the runner's commitment to

the sport, the greater the conflict experienced at home. Results also showed that whether or not the partner ran played an insignificant role in the frequency of conflicts in a family (r = -,02). Forty-two percent of the "full-time" runners, or most committed, reported that they had reappraised a relationship because of their commitment to running. Robbins and Joseph did acknowledge that many activities could lead to conflict within the family. Before making final deductions, these should be considered. The findings showed that the orientation of runners to work was found to be similar across all levels of commitment. Furthermore, running did not affect work negatively, but rather many used it as a means of revitalizing one for work. Unfortunately, Robbins and Joseph did not detail any statistics regarding their findings. This limits the study and thus, before generalizations can be made further research in this area is needed.

Thaxton (1982) hypothesized that even slight variations in a runner's training program would result in mood variations. Thirty-three American runners, who had been running at least one year and who ran on at least five days a week, were assigned to groups using the Solomon four-group experimental design. According to Thaxton, the sample was representative of the running population. However, this statement was made without the necessary clarification. On the day of the experiment two of the groups ran and the other two not. One of the running groups and one of the non-running groups completed the Profile of Mood States. Results showed that the running group experienced less depression than the non-running group. Unfortunately, no details regarding the other measures of POMS, namely anxiety, confusion, fatigue, vigour, tension and anger were detailed. One may question if these varied without a day's running or not. This

confusion limits the study. Nevertheless, the results do suggest that slight variations from running schedules may have a negative effect on habitual runners.

Summers, Sargent, Levy and Murray (1982), in a study which has been detailed in 2.1, also assessed the feelings of Australian runners when they were unable to run. Results indicated that 57% reported that they were concerned about loss of training, 47% felt they had let themselves down, 38% felt guilty, 36% felt irritable, depressed and in a bad mood, and 29% felt sluggish. Although these feelings are the same as those reported in the Carmack and Martens (1979) study, more runners reported them. This could be due to the fact that they were asked to report how they felt when they could not run for an unspecified period and not for a single run as requested by Carmack and Martens. Thus, the findings of these studies cannot be compared. It is unfortunate that Summers et al. did not request that the respondents list negative effects derived from running itself.

In order to assess if runners experienced any negative effects from running, Summers, Machin and Sargent (1983) included such a section in their questionnaire. This study has previously been detailed in 2.1. Findings showed that 36% of the sample experienced negative effects as a result of running. The five most frequently reported reasons were less free time (20%), disruption of time (19%), injuries (19%), general fatigue (10%) and a strain on personal relationships (7%). With the exception of injuries these reasons correspond with the findings of Robbins and Joseph (1980). All the negative effects were classified into six categories, namely physical health, psychological health (obsessed with running, short-tempered), strain on relationships, time commitment, neglect of work and miscellaneous consequences (too specific or infrequent to classify). Unfortunately, the

percentage of responses for each category was not detailed. This limits the study. Respondents between the ages of 14 and 20 years placed more emphasis on physical health, while respondents over the age of 30 years placed more emphasis on strained relationships. Runners were also asked if they saw themselves as addicted to running. Eighty-two percent responded positively to this question. This correlates with the fact that 83% reported feelings of discomfort when they could not run. Unfortunately, no further details of what is meant by discomfort was given. In other words, one may ask if they experienced feelings of guilt, irritation, depression, sluggishness and so forth as reported in the findings of Carmack and Martens (1979) and Summers et al. (1982).

A small section of Callen's (1983b) study, which has been detailed in 2.1 and 2.2, assessed if their sample experienced any negative effects because of running. Twenty-five percent of the respondents reported that they had experienced emotional problems such as depression, anger and frustration. In almost all instances, it was due to not being able to run because of injury. The figure of 25% is in sharp contrast to the 96% who derived mental and emotional benefit from the sport. However, it is not known if all the respondents who had experienced an injury had reported their feelings during this time.

Chan and Grossman (1988) stated that little attention had been given to dependence on running. In their study they attempted to determine if runners who were prevented from running would maintain the emotional benefits derived from the sport or if they would suffer from mood changes and other emotional disturbances. Sixty runners who were prevented from running and were located through injury clinics agreed to partake in the study. They formed the 'prevented' group. Sixty runners who were running as

they normally did formed the 'continuing' group. Both groups were matched according to age and training habits. These American runners were between the ages of 15 and 50 years. They had been running for at least a year, normally ran three times a week and averaged approximately 32 kms a week. The runners were, according to Chan and Grossman, representative of runners in USA. This claim may be justified if one considers the age of the runners. However, their training habits do not represent those of a cross-section of runners. The subjects did not represent runners who had just become involved in the sport or elite runners.

Those in the 'prevented' group could not run for four weeks, but could participate in other forms of exercise. After two weeks, runners in both groups were requested to complete the Rosenberg Self-Esteem Scale, the Zung Depression Scale and the Profile of Mood States. Results showed that the 'prevented' runners reported greater distress than those who were allowed to run. As measured by the POMS, the prevented runners experienced greater tension, anxiety, depression, confusion, anger and less vigour. They also had lower self-esteem and greater dissatisfaction with their body image. One may deduce that when unable to run, the psychological benefits of the sport are reversed. This study confirms the findings of the previous studies. The results of the study would have been more valid if the same group had completed the relevant measures when they were allowed to run and when they were prevented from doing so.

In their study, Chan and Lai (1990) not only determined why people run and what benefits they derive from the sport, but assessed what feelings they experience when unable to run. Of the respondents, 59,1% felt an urge to run, 38,6% experienced a low or negative mood, 27,3% suffered from insomnia, 25% suffered

from anxiety, 25% were unable to concentrate, 18,2% were irritable and 11,4% had a poor appetite. These findings are in accordance with previous studies. However, once again, this study concentrated on feelings associated with being unable to run and not with any negative effects associated with the sport itself.

The purpose of a study by Morris, Steinberg, Sykes and Salmon (1990) was to investigate what effects withdrawal or loss of running would have on regular runners. Forty males, between the ages of 18 and 52 years, were recruited. In order to partake in the study, they had to run at least three times a week and average at least 16 km a week. Their involvement in the sport had to exceed three months. During the fortnight preceding the study the volunteers were interviewed in detail about their training habits. No details as regards this aspect was given. Thus, it is uncertain what the calibre of runners in the sample was. This weakens the study because one cannot determine how representative of runners the sample was. The volunteers also had to rate on a scale of 1 to 10 how easily they would be able to stop running for two weeks and how this would affect their daily lives. They were then assigned to either the control group or the deprived group, who were not allowed to run or substitute it for any other form of exercise. On two occasions during the fortnight of the study the subjects were requested to complete the 28 item, factored, version of the General Health Questionnaire as well as a short form of the Zung Depression and Anxiety scales. The control group also kept a daily record of their training.

Results of the Morris et al. (1990) study showed that at the start of the study both groups did not differ in their expectation of the difficulties of stopping running. This helped to ensure that the two groups were matched. Results of the GHQ were in accordance with those of the Zung Depression and Anxiety

scales. Once again, the runners in the deprived group were more depressed and anxious, especially during the second week, than the running subjects. The findings of this study are consistent with previous reports, namely that the cessation of exercise results in what is commonly referred to as withdrawal symptoms.

One of the many purposes of a study by Acevedo, Dzewaltowski, Gill and Noble (1992) was to assess runners' feelings when unable to run. One hundred and twelve runners, namely 86 men and 26 women, who had run either the Western States 160 km Endurance Run or the Leadville Trail 160 km Ultramarathon responded to questionnaires given to them. Both races were in USA. Responses to open-ended questions indicated that 84,8% of the sample experienced negative psychological well-being when unable to run. Only 3,6% experienced positive psychological well-being when unable to run. Runners indicated that they felt despair, frustration, anxiety, guilt, depression, decrease in self-worth and confidence, and feelings of being trapped when unable to run. One runner stated that he felt a need for the "cleansing of running" (Acevedo et al. 1992, p.249). No other detail was given.

Ziegler (1991), in her study which was discussed in 2.2, assessed competitive and recreational runners' attitudes to their running. Both competitive and recreational runners were committed to running; however, competitive runners wished to compete against others and recreational runners did not. Results showed that the competitive runners experienced more guilt, depression, sluggishness and frustration when they missed a run than the recreational runners did. The competitive runners felt let down, and experienced negative moods and anxiety when they were unable to run. The recreational runners experienced these feelings, but to a lesser extent. The competitive runners perceived running as

something they had to do. The recreational runners did not view running in this way. From these findings one may deduce that competitive runners could experience negative effects when unable to run.

As discussed, it is apparent that there are negative effects associated with running. The majority of studies discussed have concentrated on the negative effects which result from not being able to run. When prevented from running the positive psychological benefits derived from the sport are reversed. It is unfortunate that only two studies, namely those of Robbins and Joseph (1980) and Summers, Machin and Sargent (1983), assessed if runners experienced negative effects from running per se.

2.4 The Runner's High

Famous ultra-marathon, Bruce Fordyce, (1990, p.24) once prevented from running for three days due to a bout of flu, went for a run. He, thus, described it:

> Whatever the scientific explanations may be, by the fourth day I could stand it no longer and I went running. What the experts say is all true. I felt great. I experienced a warm inner glow within five minutes of running. I experienced a Runner's High. There is such a thing. It definitely exists. I sailed along, running smoothly up the hills. At times I had to hold myself back. It was one of the best runs I have had.

Many have attempted to define and describe the runner's high. According to Wagemaker and Goldstein (1980), no clear definition of the term exists. Sachs (1980) stated that it has been described by at least 27 different adjectives such as euphoria, strength, speed, power, gracefulness, spirituality, sudden

realization of one's potential, glimpse of perfection, moving without effort and spin out.

Sachs (1980, p.2) did, however, define it as "an euphoric sensation experienced during running, usually unexpected, in which the runner feels a heightened sense of well-being, enhanced appreciation of nature and transcendence of barriers of time and space". Stamford (1985) also spoke of it as an induced state of euphoria. Similarly Sours (1981) recognized the concept as being ill-defined, but stated that it was supposedly an experience of every runner who had surpassed an initial release of tension. Sours, too, described elements of the high as a mystical unity with one's surroundings and a transcendental peak of great pleasure with feelings of boundless endurance and mental acuity. Solomon and Bumpus (1981) equated the runner's high with peak experiences, namely moments when one feels a flash of joy or fulfillment at being one with the world and with oneself, as described by Maslow (cited in Morris, 1976). Ravizza also likened it to Maslow's peak experience and "those moments of highest happiness and fulfillment" (1984, p.453). Cratty and Davis (1981) described the runner's high as an experience which came in the form of some kind of out-of-body feelings and a feeling of moving in slow motion. Similar feelings have been described by well-known runner and writer, Raymond Bridge (1978). According to Callen (1983a), many descriptions bear resemblance to hypnotic states as described by Fromm.

It is evident from the descriptions given that the runner's high is rather vague and ill-defined, although descriptions of the concept are boundless. Furthermore, its prevalence among runners has not been quantified in a convincing way. According to Dishman (1985), from 10% to 78% of runners have reported this experience. Such a wide range of people reportedly experiencing

this adds to the ambiguity of the concept. Furthermore, few studies have investigated the runner's high. These few studies will thus be discussed in chronological sequence. As these studies have all been discussed in the previous sections, the methodologies will not be detailed again.

In their study, Carmack and Martens (1979) also briefly assessed aspects of the runner's high. Findings showed that this state only occurred after 40 minutes of running. Although this finding was in accordance with Kostrubala's (1976) postulation, it remains vague and needs further clarification.

Summers et al. (1982) reported in their findings that 48% of their sample of 363 Australian runners had experienced a high. Of these, 37,6% described it as a feeling of psychological well-being, 35,6% as a feeling of physical well-being and 19,4% as 'spin-out', which in turn was described as a dreamy and detached feeling. One may question if a runner who experienced a feeling of psychological well-being also experienced a feeling of physical well-being and 'spin-out'. The details regarding these findings were not given. Furthermore, according to statistics supplied, at least 8% of those who experienced a high did not describe the feeling. The above-mentioned facts limit the study. Only 24% of those who had a high experienced it during a marathon. Glasser (1976) speculated that this is so because one will seldom experience a high when one is pursuing a goal.

Summers et al. (1983), in a similar study to the Summers et al. (1982) study, reported that 42% of their sample of 459 Australian runners had experienced a high. Of these 56% described it as a feeling of well-being, with feelings of optimism and happiness predominant. Eighteen percent described it as a trancelike,

transcendental state, in which they described themselves as detached, dreamy and floating. One may question if the latter is synonymous or similar to the 'spin-out' feeling as indicated in the Summers et al. (1982) study. If one accepts the synonymity or similarity of the terms, then the findings of the two studies are consistent as regards this aspect. The Summers et al. (1982) study and the Summers et al. (1983) study are limited because the descriptions given are not detailed.

Summers et al. (1983) also reported that 50% of those who had a runner's high experienced it between 15 and 26 kms. Certainly, this would be after 40 minutes of running as indicated by Kostrubala (1976) and Carmack and Martens (1979). No details regarding the other 50% was given.

Callen (1983a) reported that 69% of his sample of 424 American runners had experienced a high. Of these 5% said it was most noticeable during the first half of the run, 64% during the second half and 24% after the run. Seven percent did not respond to this question. Furthermore, 63% reported that having a high depended on how far they ran, 31% stated that it did not and 6% did not respond. No details as regards how far the 63% had to run to have a high was indicated. The fact that 31% stated that distance made no difference contradicts the findings of Kostrubala (1976) and Carmack and Martens (1979). Although no details are given, 58% reported they had mental images during the high. A light or floating sensation was reported by 58%. This light or floating sensation may be similar or even identical to the 'spin-out' feeling and the transcendental state described by Summers et al. (1982) and Summers et al. (1983) respectively. If this is the case, then Callen's findings do not agree with those of Summers et al. (1982) and Summers et al. (1983). As opposed to the 58% who reported this feeling in Callen's (1983) study,

,4% reported a 'spin-out' feeling in the Summers et al. (1982) udy and 18% reported a transcendental state in the Summers et . (1983) study. These terms, however, may not be similar. fty-seven percent reported that they were more creative, 56% perienced an altered state of consciousness and 43% imagined emselves winning races. Upon analysis, these statistics are ncerned chiefly with thoughts during a high and not with feelgs, as the other studies discussed thus far in this section ve done. Callen only related what a few respondents had rerted as regards their feelings. One runner described the high a 'run-forever-feeling'. A few compared the high to smoking rijuana and drinking alcohol while a few likened it to a religious experience. Many also said that it was a most pleasant experience and would do anything to repeat it. It is unfortunate that only a few reported their feelings during a high. This further adds to the ambiguity of the concept, the runner's high. As previously stated, Callen claimed that the runner's high is a form of auto-hypnosis as the repetitive and rhythmic nature of running could be conducive to hypnosis. Research is needed to verify such statements.

In a similar study to that of Callen (1983b), Chan and Lai (1990) also included a section on the runner's high in their questionnaire. Of their sample of 44 runners from Hong Kong, 93% reported that they had experienced a high. Of these 12% stated that their high was most noticeable during the first half of the run, 24% during the second half and 56% after the run. Eight percent did not respond to this question. These findings are not in accordance with those of Callen (1983b). Callen's (1983b) study has been discussed in the preceding paragraph. The thoughts and feelings which the runners experienced during a high are as follows: 46% were more creative, 36% had mental images, 31% were in a trance or altered state of consciousness, 23% solved life's

roblems at work and at home, and 23% had a light or floating ensation. Once again, these findings are not in accordance with hose of Callen (1983b). This could be due to the fact that the amples of the two studies differed as regards size and nation- lity. Chan and Lai's study also concentrated chiefly on houghts and not feelings. As stated previously, this further dds to the ambiguity of the concept, especially as feelings dom- nate in all definitions and explanations of it.

nother of the purposes of Acevedo, Dzewaltowski, Gill and oble's (1992) study discussed in 2.3, was to assess the runner's erception of the runner's high. This was addressed by asking them if they had experienced it, how often they experienced it and to provide a description of it. Of the 112 respondents, 60,3% had experienced a high and 39,7% had not. Of those who experienced a high, 17% experienced it weekly, 17% experienced it monthly and 8,9% yearly. The others who had experienced a high did not indicate the frequency. The descriptions of the runner's high were varied. Twenty-five percent described the runner's high as a positive feeling, 12,5% as a feeling of 'flow' or invincibility or merely 'I could run forever', and 6,3% as a dream state. Individual responses of the description of the high included a sense of accomplishment, a feeling of being outside one's self, an exhilaration of being alive and a feeling of being in a vacuum. Once again, this study indicates the vagueness of the runner's high.

Masters (1992) investigated the runner's high in a sample of marathon runners in the Southwest United States Marathon. Subjects were recruited by means of an announcement placed in several sports shops, announcements at local road races and at three local running clubs. Of the 1 428 who completed the marathon, only 30 men and 18 women completed questionnaires which were

mailed to them. The Runner's High Questionnaire was an exploratory instrument designed to acquire definitional information about the high. Six adjective phrases, based on previous descriptions on this phenomenon, were supplied. The runners were required to indicate which adjective described the high most accurately. The runners' own descriptions could be a seventh choice. When more than one description applied, they had to rank them. Results indicated that 73% had experienced a high in training and 66% had experienced it in the marathon. The description most given to the high was a feeling of general relaxation. Of the sample of 48, 29 gave this response. The description used least was a feeling of total euphoria. Only two of the respondents used it. Unfortunately, no other detail of the six adjectives was given. The runners' own descriptions included 'no pain,' 'floating,' 'strong feeling' and 'total concentration on the finish line'. No further detail was given. It is, thus, difficult to draw any conclusion.

The few studies which have dealt with the runner's high have not clarified this vague ill-defined concept. Consequently, further research is needed. It must be appreciated, however, that the runner's high is extremely difficult to research because of its subjectivity. Although only a few studies have concerned themselves with it, attempts have been made to explain why it occurs. These have concentrated on the increase of endorphin, a biochemical substance which changes as a result of running. This theory will be briefly outlined. Endorphins, which are naturally occurring substances in the brain, have been identified as being significant in experiencing the runner's high. They are important in regulating emotion and perceiving pain (Sachs, 1984). Appenzeller, Standefer, Appenzeller and Atkinson (1980) found that endurance running produced a marked increase in endorphins. However, according to these researchers, whether this increase is

responsible for the euphoria experienced in the runner's high is speculative. Colt, Wardlaw and Frantz (1981) also demonstrated that running caused increased plasma-endorphin in five of the seven subjects they tested. As there was only a small increase in the plasma-endorphin one may conclude that the decrease in anxiety, increase in euphoria and other mood changes cannot be attributed to the small biochemical changes which were recorded.

Although the evidence is speculative Callen (1983b) postulated a possible sequence of events in a runner's high. After running for a while, one experiences pain which releases endorphins. These act at central nervous system receptor sites, reduce pain and allow the runner to continue. As the runner continues, there is a gradual increase in occupied receptor sites until a particular threshold is reached. This results in a pleasurable or euphoric state of mind. Because of one's desire to experience pleasure, one would run more. Glasser has suggested that this may account for "the addictive in positive addiction" (1978, p.2). This account is speculation. One may conclude that further research is needed not only to describe the runner's high, but to explain why it occurs.

2.5 Conclusion

The recent research dealing with psychological aspects of long-distance running have focused primarily on motivation for participation, perceived mental and emotional benefits, negative effects and the runner's high. As discussed in this chapter, although runners become involved in the sport for a variety of reasons, the reason given most frequently concerns itself with physical fitness. Although physical fitness remains an important reason for adherence to the sport, psychological reasons such as tension reduction and a means of relaxation are also important

reasons for adherence to long-distance running. Runners also experience many psychological benefits such as a decrease in depression, stress reduction and a positive self-image as a result of running. However, runners experience negative psychological effects, if unable to run. These include depression, anxiety and irritability. Runners also associate their sport with negative effects such as relationship problems. Recent research also shows the runner's high to be a vague, ill-defined concept. The present study, which is outlined in subsequent chapters, focuses on the reasons South African runners become and remain involved in long-distance running, the perceived psychological benefits and negative effects they associate with the sport, and their perception of the runner's high. The hypotheses of the present study are listed under the psychological aspects discussed in this chapter, namely motivation for participation, perceived psychological benefits, negative effects and the runner's high.

2.5.1 Motivation for Participation

1. South Africans become involved in long-distance running chiefly because of physical fitness and health reasons.
2. South Africans remain involved in long-distance running mainly because of physical fitness and health reasons as well as psychological benefit reasons.

2.5.2 Perceived Psychological Benefits

1. South African long-distance runners believe they experience psychological benefits as a direct result of running.
2. South African long-distance runners of varying abilities perceive the same psychological benefits as a result of long-distance running.

3. Regardless of the distance South African long-distance runners run each week, they perceive the same psychological benefits derived from the sport.

2.5.3 Negative Effects

1. When unable to run, South African long-distance runners may experience perceived negative psychological effects.
2. South African long-distance runners may experience a few negative effects, such as injury problems and relationship problems, as a direct result of long-distance running.

2.5.4 The Runner's High

1. The runner's high is an ill-defined concept amongst South African long-distance runners.
2. South African runners who experience the runner's high perceive psychological benefits with the same intensity as those runners who do not experience the runner's high.

The method employed in the present study to test these hypotheses is outlined in the next chapter.

CHAPTER THREE

METHOD

3.1 Participants

The participants in the study were 777 South African marathon runners who competed in the 1992 Two Oceans Marathon. The researcher decided to send 2000 long-distance runners a questionnaire each. The Two Oceans Marathon is the second most popular ultra-marathon in South Africa. According to Cameron-Dow (1989), it attracts more than 8000 runners from the entire country each year. The most popular road race in South Africa is the Comrades Marathon. This race attracts in excess of 13 000 runners each year (Alexander, 1985). Further details of both these races were given in Chapter One. Hence, it is sufficient to state that it is generally accepted amongst South African long-distance runners that the South African long-distance running population is represented by the entrants of the Comrades Marathon and the Two Oceans Marathon. Accordingly, the researcher decided to send questionnaires to a sample of the participants of either of these two races in the present study.

The first section of the questionnaire determined the biographical characteristics of the respondents. Based on this information the biographical characteristics of the respondents were as follows:

Of the 777 respondents, 699 (90%) were male and 78 (10%) were female. The marital status of the respondents was as follows: 543 (69,9%) were married, 174 (22,4%) were single, 34 (7%) were divorced and one (0,1%) was widowed. Five (0,6%) of the respondents did not indicate their marital status.

The mean age of the respondents was 37. The mode for the age of the respondents was 38. Of the respondents, 47 (6,1%) were 38 years of age. The youngest respondent was 18 years. In South Africa, participants in marathons and ultra-marathons have to be at least 18 years of age. The oldest respondent was 65 years. This does not necessarily indicate that this respondent was the oldest participant in the 1992 Two Oceans Marathon, as only a minimum age limit is set for entrants. For easier comprehensibility and clarity, the researcher has placed the ages in categories. This is displayed in Table 1.

Table 1 - Frequency and percentage distribution of the ages of the respondents

Age	Frequency	Percentage
Younger than 20	2	0,3
20 - 29	137	17,6
30 - 39	359	46,2
40 - 49	225	28,9
50 - 59	45	5,8
60 and over	9	1,2

In order to run major races in South Africa, such as the Two Oceans Marathon, one has to be a registered runner. To be a registered road runner in South Africa, one has to belong to a club. The South African Road Runners Association has divided the country and thus, clubs, into 13 provinces or regions. The regions or provinces to which the respondents were affiliated are shown in Table 2. As indicated in Table 2, Western Province had the most respondents. This does not necessarily mean that Western Province has the most long-distance runners in South

Africa. As the Two Oceans Marathon is held alongside the coast near Cape Town, it is to be expected that most of the participants are from that region. Thus, most of the sample and respondents, too, were from Western Province.

Table 2 - Frequency and percentage distribution of the regions/provinces of the respondents

Region/Province	Frequency	Percentage
Far North	0	0
Northern Transvaal	26	3,4
Transvaal	222	28,6
Eastern Transvaal	5	0,6
Western Transvaal	7	0,9
Orange Free State	23	3
Natal	141	18,2
Border	24	3,1
Eastern Province	62	8
Western Province	233	30
South Western Districts	10	1,3
Griqualand West	8	1
North Western Cape	14	1,8
Missing data	2	0,1

The respondents were asked to state their occupation. This produced a long list. Subsequently, the researcher divided the occupations into 18 categories. These are shown in Table 3.

Table 3 - Frequency and percentage distribution of the occupations of the respondents

Occupation	Examples thereof	Frequency	Percentage
Medical	dentist, nurse	46	5,9
Legal	lawyer, judge	21	2,7
Engineer	civil, chemical	62	8,0
Education	teacher, lecturer	44	5,7
Building	architect	44	5,7
Agriculture	farmer, gardener	11	1,4
Professional	not listed elsewhere	32	4,1
Finance	banker, auditor	75	9,7
Computer	analyst	17	2,2
Business	clerk, director, secretary, sales	242	31,2
Art	artist, music	6	0,8
Security	police, prisons	26	3,4
Trade/Technical	technician, plumber	77	9,9
Student		31	4,0
Housewife		16	2,1
Self-employed		16	2,1
Sheltered employment		1	0,1
Unemployed		4	0,5
Missing data		6	0,8

Section 2 of the questionnaire determined the running habits of the respondents. Based on the information given the running habits of the respondents are, thus, described.

The mean for the respondents' best marathon time was 3 hours 24 minutes. The respondents' best marathon times ranged between 2 hours 16 minutes and 4 hours 22 minutes. It is worth noting that the world record for the marathon is 2 hours 6 minutes 50 seconds. It is held by Belayneh Densimo from Ethopia (Mackay, 1994, p.11). In order to compete in the Two oceans Marathon one is required to run a marathon beforehand in under 4 hours 30 minutes. The respondents' times are displayed in Table 4 and show the broad spectrum of their ability in this regard.

Table 4 - Frequency and percentage distribution of the best marathon time of the respondents

Best marathon time	Frequency	Percentage
Less than 3 hours	134	17,3
3 hours - 3 hours 14 minutes	131	16,9
3 hours 15 minutes - 3 hours 29 minutes	124	16,0
3 hours 30 minutes - 3 hours 44 minutes	193	24,8
3 hours 45 minutes - 3 hours 59 minutes	128	16,4
4 hours and longer	66	8,5
Missing data	1	0,1

Respondents were asked how many kilometers they ran during March and April. The months, March and April, were specified because these are the two months leading to the Two Oceans Marathon. Consequently, it was felt because this included their most recent and present training, it would be uppermost in the respondents' minds and therefore, be the most accurate. The data are in categories, which are displayed in Table 5.

Table 5 - Frequency and percentage distribution of the kilometres run per week by the respondents during March and April

Kms run per week in March and April	Frequency	Percentage
70 km or less	276	35,5
71 - 90 km	255	32,8
91 - 120 km	207	26,6
More than 120 km	38	4,9
Missing data	1	0,1

Respondents were also asked how many kilometers they ran a day during the other months of the year. Many respondents did not answer this question. Furthermore, many of those who answered it, answered it in a confusing manner. Hence, the researcher has not included their data. However, 57,53% of those who understood the question ran between six and ten kilometers each day.

Respondents were asked whom they usually ran with. Ninety-eight (12,6%) of the respondents always ran alone, 365 (47%) usually ran alone and occasionally with others, 245 (31,5%) usually ran with others and occasionally alone, and 55 (7%) always ran with

others. Fourteen respondents did not indicate a choice to the question.

Respondents were asked how long they had been involved in long-distance running. For clarity purposes the researcher divided the responses into four categories. These are displayed in Table 6.

Table 6 - Frequency and percentage distribution of the length of time the respondents were involved in long-distance running

Time of involvement	Frequency	Percentage
Less than 1 year	46	5,9
1 - 5 years	386	49,7
6 - 10 years	205	26,4
More than 10 years	137	17,6
Missing data	3	0,4

3.2 Apparatus

In order to test the hypotheses stated in 2.5, a questionnaire was designed. This was done after an in-depth study of the relevant literature, which was discussed in Chapter Two. The researcher is also involved in long-distance running and consequently, also relied on personal experience and consulted with other long-distance runners when designing the questionnaire.

To test the hypotheses, extensive rather than intensive research was needed. According to Kerlinger (1986), questionnaires are best suited to extensive, not intensive research. Furthermore,

within sampling error, information obtained from questionnaires is known to be very accurate (Kerlinger, 1986). Consequently, it was decided to design and use a questionnaire. As poor response rates may disadvantage mailed questionnaires, the researcher sent out 2000 questionnaires to overcome this potential problem. As stated in 3.1, 777 questionnaires were returned.

The questionnaire was divided into four sections or parts (refer to Appendix 1 for a copy). The first part of the questionnaire determined personal particulars or biographical characteristics. These included age, gender, marital status, running club and occupation. These biographical characteristics were to describe the sample and have been dealt with in 3.1.

Part Two of the questionnaire dealt with running habits. These included length of time involved in long-distance running, best marathon time, kilometres run every week and whom one ran with, be it alone or with others. This section, too, was to describe the sample and has been dealt with in 3.1.

Part Three, entitled, "The Benefits of Running", was the core of the questionnaire. The first question, an open-ended question, asked for reasons for original involvement in running. The second question was also open-ended and asked for three reasons for present involvement in running. Thus, the first two questions assessed original and continued motivation for participation.

The third question assessed perceived psychological benefits and negative effects of the sport by rating 32 statements on a 5 - point Likert scale. The following guideline was used:
5 - always true; 4 - Often true; 3 - Sometimes true; 2 - Seldom true; and 1 - Never true.

Of these 32 statements, 21 were designed chiefly to assess the perceived psychological benefits of long-distance running. Examples of these statements included, "After a run, I can think more clearly", "Running makes me feel relaxed" amd "Running gives me self-confidence". Nine of the statements were designed to assess negative effects when unable to run. These included, "When I am unable to run, I feel less energetic and unfit" and "If I miss a run, I'm angry with myself". The remaining two statements dealt with the negative consequences of the sport. They were, "Running has put a strain on my personal relationships" and "I would be happy if I ran less". The 32 statements proved to have internal consistency (Cronbach's α = 0,934). The average inter-item correlation for the scale was 0,321. Appendix 2 contains a table with the means and standard deviations for each item.

Factor analysis was performed on the 32 statements, which were each assessed by means of a 5 - point Likert scale. The factor analysis used was based on the Method of Principal Components. Five factors were extracted. The criteria used to extract five factors were the Scree Plot and Eigenvalues greater than one. Appendix 3 contains the Scree Plot of Eigenvalues. An inter-correlation matrix is contained in Appendix 4. Table 7 contains the inter-factor correlations and Table 8, the means and standard deviations of the factors.

Table 7 - Inter-factor correlations

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Factor 1	1,00000				
Factor 2	0,38698	1,00000			
Factor 3	0,46347	0,43289	1,00000		
Factor 4	0,27993	0,37665	0,34917	1,00000	
Factor 5	-0,00871	-0,22415	0,00245	-0,04235	1,00000

Table 8 - Factor means and standard deviations

Factor	Mean	Standard deviation
1 - Negative addiction	3,256	0,8342
2 - Positive mood	4,0098	0,6291
3 - Positive self-image	3,2801	0,8288
4 - Positive mental outlook	3,7718	0,7979
5 - Negative effects	2,074	0,8697

The nine statements designed to assess negative effects when unable to run, loaded on Factor 1. These statements included, "When I'm unable to run, I often find myself in a bad mood" and "When I cannot run, I find it difficult to concentrate at work". It has been called *negative addiction*. The 21 statements used to assess the perceived psychological benefits of running loaded on factors 2, 3 and 4. The items which dealt specifically with relaxation, psychological well-being and the enjoyment of running loaded on Factor 2. These items included, "I look forward to

running" and "Running makes me feel relaxed". Factor 2 has been called *positive mood.* Seven statements which dealt specifically with a positive self-image loaded on Factor 3. It has been called *positive self-image.* It included statements such as "Running gives me self-confidence" and "Because of running I feel physically attractive". Four statements were loaded on Factor 4. They included, "After a run, I can think more clearly" and "I am enthusiastic about life because of running". This factor has been termed *positive mental outlook.* The two statements, previously stated, which dealt with the negative effects of running loaded on Factor 5. It has been called *negative effects.* Question 4 was an open-ended question and asked for positive benefits derived from running. Finally, Question 5, also an open-ended question, determined negative effects of running. Thus, Questions 3, 4 and 5 assessed perceived psychological benefits and negative effects of running.

Part Four of the questionnaire dealt with the runner's high. The first six questions were of a closed nature and assessed whether or not a high had been experienced, and, if so, under what circumstances. These circumstances included distance run when a high had been experienced and if the high had occurred only during training, during training and races, or only during races. Question 7 was open-ended and asked what emotions/feelings had been experienced during a high. Question 8, also open-ended, asked what thoughts had occurred during a high. The final question of the section contained 15 fixed-alternative items. These fixed-alternative items assessed what happens during a high. Examples of these items included, "I seem to float", "I have a feeling of euphoria, almost unreal happiness" and "I am relaxed and tranquil".

3.3 Procedure

The researcher approached the organizers of both the Comrades Marathon and the Two Oceans Marathon. They were asked if they would allow the researcher to send questionnaires to a sample of entrants from the 1992 race. Organizers from the Comrades Marathon could unfortunately not oblige. Linda Barron of the Comrades Marathon Association (CMA) reported that it is the policy of the CMA not to become involved in any research (personal communication, 25 November 1991). Organizers of the Two Oceans Marathon, Chet and Annemarie Sainsbury, were willing to give the researcher a printout of the names and addresses of entrants in the 1992 race (personal communication, 28 November 1991). On 14 March 1992, the researcher received a printout of the names and addresses of the first 5000 runners who entered the 1992 I&J Two Oceans Marathon.

The researcher used random number tables to select the sample of 2000. A questionnaire was sent to each of the 2000. A self-addressed stamped envelope was included. This was done to try to ensure a high response rate. The sample was also assured of the confidentiality of their replies. The questionnaires were posted two weeks before the Two Oceans Marathon was due to be held. It was reasoned that the sample's interest in running would possible be at its highest soon before the race, and thus, aid a high response rate. Of the 2000 questionnaires sent, 777 were returned. Thus, a response rate of 38,85% was achieved.

Before mailing the questionnaires to the sample of 2000, it was necessary to determine if the instructions and questions would be understood by members of the long-distance running fraternity. Hence, 20 long-distance runners, known to the researcher, were

each given a questionnaire and asked to comment on the comprehensibility of it. This was done and the runners reported that they found the instructions to be clear and questions comprehensible. Only one adjustment was made. In Part Two, the question which deals with whom one trains with originally had three options, namely always alone, sometimes alone and sometimes with others, and always with others. A few of these 20 runners reported that the three options were not broad enough. Hence, in the revised questionnaire, four options are given. These are alone always, usually alone and occasionally with others, usually with others and occasionally alone, and with others always. On the basis of this exercise, namely asking 20 runners to comment on the comprehensibility of the questionnaire, the face validity of the questionnaire was enhanced.

The first step taken in the process of data analysis was to read each questionnaire individually. This process was deemed necessary to ascertain if the responses to the open-ended questions could be grouped into specific categories. For example, Question 4 of Part Two reads, "What positive benefits do you experience in your life as a result of running?" Upon reading each questionnaire individually, the researcher was able to form six categories. This procedure was adhered to for all the open-ended questions. These categories will be described fully in the next chapter, which deals specifically with the results of the study. The researcher used the SAS program, (*Sas-Stat; User's Guide Version 6*, 1990) to analyse the data.

CHAPTER FOUR

RESULTS

In order to achieve clarity and comprehensibility, the results are presented in sections under the various psychological aspects of long-distance running, which were discussed in Chapter Two. These aspects are motivation for participation, perceived psychological benefits, negative effects and the runner's high. Furthermore, the results are presented according to the research questions of the study. These were detailed in Chapter One.

4.1 Motivation for Participation

Why do South Africans start and continue to run long distances? Question 1 of Part Three of the questionnaire, entitled "The Benefits of Running", assessed reasons for original involvement in running. As an open-ended question, the respondents could have given one or more reasons. The researcher took into account the first two reasons given by each respondent. However, if a respondent gave two reasons which could be classified in the same category, these reasons were only considered as one reason, not two.

Respondents gave a great variety of reasons. The researcher classified the responses into six categories. The first category is *physical fitness and health.* Responses in this category included a need to improve one's health, wanting to be fit, wanting to cure ailments such as insomnia, a need to exercise and wanting to keep fit for other sports. The second category is *weight control.* Those responses which indicated initial involvement in order to lose or maintain a particular weight were placed into this category. Category 3 is *friends and family.*

Any response which indicated that a respondent had started running because of the influence of friend(s) and/or family was placed into this category. Category 4 is entitled *psychological benefits*. It included responses such as a need for relaxation, a need to reduce stress, wanting to improve one's self-image and wanting to run for enjoyment. Category 5 is *goal attainment*. It included responses which indicated that the respondent was running to fulfill personal challenges as well as those issued by others. This category also included responses which indicated that the respondent had a natural talent for the sport and wanted to achieve excellence. Responses which did not fall into any of the categories described above were placed into *other reasons* (Category 6). Results are displayed in Table 9.

Table 9 - Percentage distribution of the respondents' reasons and responses given for original involvement in long-distance running

Reasons	Respondents (%)[a]	Responses (%)[b]
1. Physical fitness and health	70,9	48,9
2. Weight control	18,5	12,8
3. Friends and family	11,3	7,8
4. Psychological benefit	25,5	17,6
5. Goal attainment	17,1	11,8
6. Other reasons	1,5	1,1
Missing data	0,5	----

NOTE a. Each respondent could give more than one response. Therefore, the results reflected as the percentage of the respondents do not total 100.

b. 1126 responses were given.

As reflected in Table 9, the respondents originally became involved in long-distance running mainly for reasons of physical fitness and health. This is true when one considers that 70,9% of the respondents gave physical fitness and health as one of the reasons. It is also true when one considers that 48,9% of the responses were physical fitness and health reasons. Furthermore, many consider weight control to be a reason of physical fitness and health. If so, even more respondents would have been motivated to become involved in the sport for physical fitness and health reasons. Thus, the first hypothesis in this section, *South Africans become involved in long-distance running chiefly because of physical fitness and health reasons*, was accepted.

In Question 2 of Part Three, respondents were asked to give three reasons why they had remained involved in long-distance running. This question was used to assess reasons for adherence to the sport.

Respondents gave a wide variety of reasons. The researcher classified the responses into six categories. The same categories used to classify the reasons for original involvement were used. Category 4, *psychological benefit*, also included responses which indicated that the respondents ran because it helped them in their jobs or relaxed them of any stress created as a result of their jobs. Table 10 contains the results.

As reflected in Table 10, the respondents remained involved in long-distance running mainly for reasons of physical fitness and health, as well as reasons of psychological benefit. This is true when one considers the percentage of the respondents who gave these reasons as well as the percentage of responses for each of these reasons. Once again, if weight control had been considered as a physical fitness and health reason, more

respondents would have remained involved in long-distance running for physical health and fitness reasons. The second hypothesis related to the first research question, namely *South Africans remain involved in long-distance running mainly because of physical fitness and health reasons as well as psychological benefit reasons*, was accepted.

Table 10 - Percentage distribution of the respondents' reasons and responses given for adherence to long-distance running

Reasons	Respondents (%) [a]	Responses (%) [b]
1 Physical fitness and health	97,4	34,0
2 Weight control	21,2	7,4
3 Friends and family	35,1	12,3
4 Psychological benefit	92,4	32,3
5 Goal attainment	35,6	12,5
6 Other reasons	4,4	1,5
Missing data	1,2	-----

NOTE a. Respondents were asked to give three reasons. Hence, the results reflected as the percentage of respondents do not total 100.

b. 2224 reasons were given.

4.2 Perceived Psychological Benefits

What positive benefits do South African marathon runners associate with their sport?

As explained in 3.2, two questions of the questionnaire assessed the perceived benefits of running. Question 4 of Part Three of the questionnaire was an open-ended question and asked respondents what positive benefits they experienced as a result of running. Question 3 of Part Three contained 32 statements on a 5 - point Likert scale. Twenty-one of these statements assessed to what extent or to what intensity respondents believed they experienced the listed psychological benefits because of running. Thus, the open-ended question determined what benefits the respondents experienced because of running and the 21 statements, each rated on a 5 - point Likert scale, assessed how intensely the respondents believed they experienced various psychological benefits as a result of running.

Respondents gave a wide variety of responses to the open-ended question. The researcher took into account the first two reasons given by each respondent. Once again, if a respondent gave two reasons which could be classified in the same category, these reasons were considered as one reason, not two. These responses were classified into six categories. There are as follows: Category 1 - physical fitness and health; Category 2 - weight control; Category 3 - friends and family; Category 4 - psychological benefit; Category 5 - goal attainment; Category 6 - other reasons. As these were the same categories used to classify reasons for starting to run and reasons for adherence to the sport, it is not necessary to discuss responses typical of these categories. However, *psychological benefit* also included responses which indicated the respondents felt they had improved

a perceived negative lifestyle because of running. Results are contained in Table 11.

As shown in Table 11, the respondents believed they experienced psychological benefits because of long-distance running. This is the case when one considers that 82,5% of the respondents gave at least one psychological benefit as a positive result of running. This is also true when one considers that 48,2% of the responses given were psychological benefits.

Table 11 - Percentage distribution of perceived benefits of long-distance running as reflected by respondents and responses given

	Perceived benefits	a Respondents (%)	b Responses (%)
1	Physical fitness and health	56,2	32,9
2	Weight control	9,8	5,7
3	Friends and family	16,2	9,5
4	Psychological benefit	82,5	48,2
5	Goal attainment	4,1	2,4
6	Other benefits	2,3	1,4
	Missing data	4,0	-----

NOTE a. Each respondent could give more than one response. Therefore, the results reflected as the percentage of the respondents do not total 100.

b. 1330 responses were given.

Table 12 contains the results of the 21 statements each rated on a 5 - point Likert scale, which assessed perceived psychological benefits. These are grouped in the table under the three factors, outlined in 3.2, namely *positive mood, positive self-image* and *positive mental outlook*.

As reflected in Table 12, the majority of respondents believed they often or always experienced a positive mood because of running (Factor 2; refer to 3.2). This is reflected by the percentage of respondents who declared the statements pertaining to this factor to be often and always true. The majority of respondents believed they often or sometimes experienced a positive self-image (Factor 3; refer to 3.2). This is the case if one considers the percentage of respondents who declared the statements dealing with this factor to be often and sometimes true. A positive mental outlook (Factor 4; refer to 3.2) was often experienced by the respondents. This is the case if one considers the percentage of respondents who declared the statements dealing with this factor to be often true. On the basis of the data contained in Tables 11 and 12, the hypothesis, *South African long-distance runners believe they experience psychological benefits as a direct result of running*, was accepted.

Table 12 - Percentage distribution of respondents'perceived psychological benefits of long-distance running

Statement/ Item	Never true (%)	Seldom true (%)	Some-times true (%)	Often true (%)	Always true (%)	Missing data (%)
a Factor 2 Positive mood						
Running is important (1)	1,0	4,8	18,7	38,7	36,8	0
Good mood (7)	0,9	3,0	11,9	44,8	39,3	0,1
Knowledge of physical capability (12)	2,1	3,9	10,7	40,7	42,1	0,5
Relaxed (13)	1,2	1,9	10,9	44,9	40,4	0,7
Life is richer (16)	2,1	7,0	21,1	40,9	28,6	0,3
Rearrange-ment of schedule to run (18)	6,3	12,6	28,8	34,8	17,0	0,5
Well-being(22)	0,6	2,6	12,1	45,3	38,6	0,8

State-ment/Item	Never true (%)	Seldom true (%)	Some-times true (%)	Often true (%)	Always true (%)	Missing data (%)
Less tension and anxiety (27)	1,7	4,0	12,3	43,9	37,5	0,6
Look forward to running (30)	1,0	2,5	16,2	44,3	34,5	1,5
Happiness is running (32)	4,5	7,9	26,6	28,3	31,5	1,2
Factor 3 Positive self-image						
Insight and tenacity (6)	5,7	9,3	22,2	32,3	30,5	0
Assertive (10)	14,0	17,8	24,7	28,2	12,5	2,8
Creative (19)	5,8	14,0	32,3	33,0	13,8	1,1
Physically attractive (21)	7,7	10,6	28,3	33,3	19,2	0,9

State-ment/Item	Never true (%)	Seldom true (%)	Some-times true (%)	Often true (%)	Always true (%)	Missing data (%)
Answer to problems (24)	25,2	27,7	27,9	12,9	4,8	1,5
Enthusias-tic (25)	6,6	15,9	31,7	31,0	13,4	1,4
Self-confidence (29)	4,9	10,4	25,4	34,6	23,6	1,1
Factor 4 Positive mental outlook						
Think clearly (3)	2,6	6,4	21,4	39,6	29,6	0,4
Energetic (4)	2,1	6,4	16,4	40,3	34,5	0,3
Alert (20)	1,8	5,5	21,9	47,5	22,4	0,9
No depression (9)	15,4	12,5	17,3	24,7	27,8	2,3

NOTE: The statements, each rated on a 5 - point Likert scale, have been grouped under the factors, outlined in 3.2

In order to test if long-distance runners of varying abilities perceive different benefits as a result of the sport, a contingency table was prepared. The respondents' best marathon

times were used as an indication of their ability (refer to Table 4). The open-ended question, which asked for positive benefits derived from running, was used to determine perceived benefits (refer to Table 11). Table 13 shows the distribution of perceived benefits amongst runners of varying abilities. A χ^2 test was performed to test the dependence of the two variables. Results show that *South African long-distance runners of varying abilities perceive the same psychological benefits as a result of long-distance running.* χ^2 (25, n = 1328) = 27,128; p = 0,529.

In order to test if the distance runners run each week influences their perceived benefits, a contingency table was prepared. The distance run each week was determined by the kilometres respondents run during March and April (refer to Table 5). The classification used is one normally used, in the researcher's personal experieence, by many long-distance runners. The open-ended question which asked for positive benefits derived from running was used to determine perceived benefits amongst runners who run varying sidtances each week. A χ^2 test was performed to test the dependence of the two variables. Results show that *regardless of the distance South African long-distance runners run each week, they perceive the same psychological benefits derived from the sport.* χ^2 (15, n = 1329) = 13,952; p = 0,529.

Table 13 - Percentage distribution showing the comparison of responses given for perceived benefits among long-distance runners of varying abilities

	Perceived benefits					
Best marathon time	Physical fitness and health	Weight control	Friends and family	Psycho-logical	Goal attai nment	Other
Less than 3 hours	15,4	14,47	15,87	19,38	25,00	11,11
3 hrs - 3 hrs 14 mins	15,83	19,74	19,84	13,91	15,63	27,78
3 hrs 15 mins - 3 hrs 29 mins	18,58	14,47	13,49	15,94	9,38	33,33
3 hrs 30 mins - 3 hrs 44 mins	24,08	17,11	27,78	26,72	25,00	11,11
3 hrs 45 mins - 3 hrs 59 mins	18,35	22,37	14,29	15,94	12,5	16,67
4 hrs and longer	8,03	11,84	8,73	8,13	12,50	0,00

χ^2 (25, n = 1328) = 27,128; p = 0,364

NOTE: Each respondent could give more than one response. Therefore, the total of each row is not necessarily 100%.

Table 14 - Percentage distribution showing the comparison of responses given for perceived benefits among long-distance runners who run varying distances each week

	Perceived benefits					
Distance run each week	Physical fitness and health	Weight control	Friends and family	Psycho-logical	Goal attain-ment	Other
70 km or less	39,36	36,84	31,75	32,81	21,88	33,33
71 - 90 km	31,58	34,21	33,33	35,16	43,75	27,78
91 - 120 km	25,86	23,68	29,37	26,41	31,25	38,89
More than 120 km	3,20	5,26	5,56	5,63	3,13	0,0

$\chi^2(15,\ n = 1329) = 13,952;\ p = 0,529$

NOTE: Each respondent could give more than one response. Therefore, the total of each row is not necessarily 100%.

4.3 Negative Effects

What negative effects do South African marathon runners associate with their sport?

As discussed in 2.3, long-distance runners may experience a reversal of psychological benefits when unable to run. They may also experience negative effects, such as relationship problems

and physical injuries, as a direct result of the sport.

The nine statements, each rated by means of a 5 - point Likert scale, which loaded on Factor 1, negative addiction (refer to 3.2), assessed perceived negative psychological effects when unable to run.

As indicated in Table 15, the majority of respondents believed that when unable to run, they do experience negative psychological effects. Furthermore, as shown, certain negative effects are experienced more than others. Hence, the hypothesis, *When unable to run, South African long-distance runners may experience perceived negative psychological effects*, was accepted.

An open-ended question which read, "Has running had any negative effect on your life?" was used to determine if runners experienced any negative effects because of their involvement in the sport. As an open-ended question, respondents could give more than one negative effect. The first two reasons given by each respondent were taken into account. However, if a respondent gave two reasons which could be classified in the same category, these reasons were considered as one, not two reasons.

The researcher classified the responses to the open-ended question into six categories. Category 1 is *expense* and included any response which indicated running to be a financially expensive sport. Category 2 is *physical fitness and health*. Included in this category was any response which indicated that the respondent was suffering from a physical running injury and/or that he/she had physical health problems because of the sport. Category 3, *relationships*, included any response which stated that the respondent was experiencing a human relationship problem due to the sport. Category 4 is entitled *commitment*.

Any response which indicated that running involved too great a commitment or that it interfered with other activities was included in this category. Category 5, *obsession*, included responses in which the respondent felt he/she had a negative addiction or unhealthy obsession with the sport. Responses which did not fall into any of the categories described above were placed into *other reasons* (Category 6). Results are displayed in Table 16.

Table 16 shows that although there was missing data for 50,6% of the respondents, the respondents experienced negative effects because of their involvement in long-distance running. Relationship problems as well as physical fitness and health problems were the most common negative effects experienced by the respondents. This is the case when one considers the percentage of the respondents who gave these reasons as well as the percentage of responses for each of these reasons. It is uncertain whether 50,6% of the respondents had not experienced any negative effects or if they merely did not answer the question.

The hypothesis, *South African long-distance runners may experience a few negative effects, such as injury problems and relationship problems, as a direct result of long-distance running*, was accepted.

Table 15 - Percentage distribution of respondents' perceived negative effects when unable to run

Statement	Never true (%)	Sel-dom true (%)	Some-times true (%)	Often true (%)	Al-ways true (%)	Miss-ing data (%)
Factor 1 Negative Addiction						
Less energetic and unfit (31)	3,2	10,0	25,0	34,5	26,7	0,6
Discomfort (8)	3,6	11,6	27,8	33,3	23,3	0,4
Restless and frustrated (14)	5,9	11,8	25,2	36,3	20,5	0,3
Depressed, tired and irritable (2)	5,4	12,5	29,3	34,6	17,9	0,3
Angry with self (5)	8,5	17,6	35,5	23,3	14,8	0,3
Guilt and worthlessness (23)	9,7	18,2	30,7	26,3	14,8	0,3
Bad mood (17)	10,4	24,0	31,2	23,7	10,2	0,5
Must run once a day (11)	19,6	16,5	24,6	25,2	13,9	0,2
Poor concentration at work (28)	16,9	27,7	33,9	15,5	5,3	0,7

Table 16 - Percentage distribution of the negative effects of long-distance running as reflected by respondents and responses given

Negative effect	Respondents (%)[a]	Responses (%)[b]
1 Expense	3,4	5,5
2 Physical fitness and health	19,4	31,8
3 Relationships	20,9	34,1
4 Commitment	11,1	18,1
5 Obsession	5,4	8.8
6 Other reasons	1,1	1,7
Missing data	50,6	-----

NOTE: a. Each respondent could give more than one response. Thus, the results reflected as the percentage of the respondents do not total 100.

b. 475 responses were given.

4.4 The Runner's High

What thoughts and moods do South African long-distance runners associate with the runner's high phenomenon, if they experience this euphoric feeling when running?

Part Four of the questionnaire dealt with the runner's high. All questions in this section assessed the way respondents defined the occurrence, frequency and nature of the experience. Table 17 shows the occurrence and frequency of the runner's high amongst the respondents.

Upon examining Table 17, it will be noted that the majority of respondents who had experienced a high had experienced it during training and races. However, there appears to be confusion concerning the distance run when a high is experienced. Whereas 41,8% of the respondents said obtaining a high depended on the distance run, 72,6% were able to state the distance they had run when they experienced a high. This discrepancy helps to show that there is confusion concerning the runner's high.

In an open-ended question respondents were asked what emotions/ feelings they experienced during a high. In another open-ended question respondents were asked what thoughts they had during a high. For both questions the researcher took into account the first two responses given. Results are contained in Tables 18 and 19 respectively. As reflected in Tables 18 and 19, respondents experienced a variety of emotions/feelings and thoughts during the runner's high. This further shows that the concept is defined in a variety of ways. One may conclude that the runner's high is an ill-defined concept.

Table 17 - Percentage distribution of respondents' experiences of a high

Experience of a high		Respondents (%)
1	Have you experienced am emotional "high" associated with running?	
	Yes	61,8
	No	37,7
	Uncertain	0,5
2	Does obtaining a "high" depend on how far you run?	
	Yes	41,8
	No	56,2
	Uncertain	2,0
3	Approximately how far have you run when you experience a "high"?	
	No particular distance	24,8
	Less than 10 km	17,1
	10 km - 20 km	22,9
	More than 20 km	29,6
	At the end of a run	5,6
4	When does your "high" occur?	
	Only during training	6,8
	During training and races	70,4
	Only during races	22,8

NOTE: Percentages for 2, 3 and 4 are based on the 479 respondents who had experienced a "high".

To further determine what happens during the runner's high the respondents were given 15 fixed-alternative items. They were

asked to consider the statements and merely write yes or no in response to each statement. Results are displayed in Table 20. They further show that the runner's high is associated with many experiences. Consequently, it is difficult to define and can be said to be an ill-defined concept. The data contained in Tables 17, 18, 19 and 20 show that the hypothesis, *The runner's high is an ill-defined concept amongst South African long-distance runners*, was accepted.

The final research question is *Do South African runners who experience the runner's high percieve psychological benefits with the same intensity as those who do not experience the runner's high*?

In order to answer the above question, two groups were distinguished, namely respondents who had experienced a high and those who had not. Any respondents who were unsure whether they had experienced a high or not, were included with those who had not experienced a high. The mean for the total score for each of the three factors which measured perceived psychological benefits (Factor 2 - positive mood, Factor 3 - positive self-image and Factor 4 - positive mental outlook) was calculated for both groups. The mean for the total score for the three factors combined was also calculated for both groups. These means and standard deviations are reflected in Table 21. In order to show if there was a significant difference between the groups as regards the intensity of their perceived psychological benefits of running, t-tests for unequal groups (equal population variances have been assumed) were performed. Results of the t-tests show that there was a significant difference between the two groups (t (775) = 6,7388; p = 0,000). These results are contained in Table 21. Hence, the hypothesis, *South African runners who experience the runner's high perceive psychological*

benefits with the same intensity as those runners who do not experience the runner's high, was rejected.

Table 18 - Percentage distribution showing the emotions/feelings experienced by respondents during a high

Emotions/Feelings		Respondents (%)
1	Calmness	2,5
2	Confidence	13,8
3	Energetic and/or fit	5,4
4	Friendly	1,3
5	Floating	9,4
6	Good mood	48,7
7	Gratitude	1,9
8	Invincibility	35,7
9	Motivated	3,6
10	Relaxed and/or peaceful	12,1
11	Satisfaction	8,4
12	Tearful	1,3
13	Spiritual	3,3
14	Other	2,7
	Missing data	5,0

NOTE: The respondents could give more than one response. Hence, the total exceeds 100%

Table 19 - Percentage distribution showing the respondents' thoughts during a high

Thoughts	Respondents (%)[a]
1 Accomplishment	25,3
2 Body	5,6
3 Spiritual	4,0
4 Goals	17,7
5 Good mood	18,8
6 Gratitude	5,6
7 Issues[b]	11,9
8 Nothing[c]	10,7
9 Other people	2,7
10 Races and/or running	17,3
11 Scenery	2,3
12 Sex	2,3
13 Other	5,6
Missing data	7,7

NOTE: a The respondents could give more than one response. Hence, the total exceeds 100%

b Issues include daily topics such as politics, the rate of inflation and the price of petrol

c Responses were placed in this category if the respondents stated specifically that they did not think during a high.

Table 20 - Percentage distribution showing the respondents' responses to the 15 fixed-alternative items which determined what happened during a high

	Item	Yes (%)	No (%)	Missing data (%)
1	My worries fade away	85	14,2	0,8
2	I just let my mind go. I am not completely aware of my surroundings	52	46,6	1,4
3	I seem to float	60,3	39,3	0,4
4	My mind is detached and dreamy	40,5	57,8	1,7
5	I have a sense of confidence and well-being	97,7	2,3	0
6	I have a feeling of euphoria, almost unreal happiness	72,4	26,1	1,5
7	I consciously try to solve a problem or figure something out	39,9	58,5	1,6
8	I am optimistic	89,8	10,0	0,2
9	I am friendly and united with all my fellow-runners	82,9	15,5	1,6
10	My mood and morale lift	97,5	2,3	0,2
11	I am creative	53,3	43,6	3,1
12	I am relaxed and tranquil	78,7	20,5	0,8
13	I have a sudden flash of insight when I least expect it	43,8	53,3	2,9
14	I am energetic and enthusiastic	92,7	6,9	0,4
15	I meditate	31,5	67,4	1,1

Table 21 - Means and standard deviations obtained for Factors 2, 3 and 4 for respondents who had experienced a high and for those who had not

Factor	Group	Number of respondent	Mean	Standard deviation
2 - Positive mood	High No High	479 298	41,0897 37,9128	5,8168 7,2437
3 - Positive self-image	High No high	479 298	23,6743 21,0705	5,46 6,3154
4 - Positive mental outlook	High No high	479 298	15,334 14,3288	3,0252 3,5314
2, 3 & 4 - Perceived psychological benefits	High No high	479 298	80,0981 73,3120	12,4812 15,3421

Table 22 - Results of t-tests performed on the means of the total scores for Factors 2,3, and 4 for respondents who had experienced a high and for those who had not.

Factor	t-value	Degrees of freedom	Probality value
2 - Positive mood	6,7269	775,0	p= 0,0000
3 - Positive self-image	6,0966	775,0	p= 0,0000
4 - Positive mental outlook	4,2198	775,0	p= 0,0000
2, 3 & 4 - Perceived psychological benefits	6,7388	775,0	p= 0,0000

In Chapter 5, the results which have been presented in this chapter will be discussed, interpreted and evaluated.

CHAPTER FIVE

DISCUSSION

The present study is an exploration into the psychology of long-distance running in South Africa. As with the majority of studies discussed in Chapter Two, this study approached the topic in a broad and descriptive manner. In order to discuss the findings of the present study clearly and concisely, they will be interpreted and evaluated in the light of the purpose of the study, which is an attempt to answer the following questions:

1. Why do South Africans start and continue to run long distances?
2. What positive benefits do South African marathon runners associate with their sport?
3. What negative effects do South African marathon runners associate with their sport?
4. What thoughts and moods do South African long-distance runners associate with the runner's high phenomenon, if they experience this euphoric feeling when running?
5. Do South African runners who experience the runner's high perceive psychological benefits with the same intensity as those runners who do not experience the runner's high?

Why do South Africans start and continue to run long distances?

South Africans become involved in long-distance running chiefly because of physical fitness and health reasons. However, to a lesser extent, they also become involved in long-distance running to enjoy the perceived psychological benefits of the sport, to lose and maintain weight, to achieve goals and because of the influence of friends and family. As depicted by one respondent of the study, "I became involved to capture the perceived

benefits of fitness, enjoyment and relaxation". Another respondent wrote, "I became disgusted with my physical fitness and lifestyle". South Africans remain involved in the sport of long-distance running mainly because of reasons of physical fitness and health as well as reasons of perceived psychological benefit. Once again, they remain involved, to a lesser degree, because of reasons of goal attainment, friends and family, and weight control. Consequently, both hypotheses related to this research problem, namely *South Africans become involved in long-distance running chiefly because of physical fitness and health reasons,* and *South Africans remain involved in long-distance running mainly because of physical fitness and health reasons as well as psychological benefit reasons,* were accepted. The findings of the present study are in accordance with the findings of most of the studies discussed in 2.1. These include Carmack and Martens (1979), Koplan et al. (1982), Summers et al. (1983), Callen (1983b), Hogan and Cape (1984), Johnsgard (1985) and Chan and Lai (1990). Hence, one may conclude that South African runners start and continue to run long distances for the same reasons as runners elsewhere in the world, namely, USA, Australia, Canada and Hong Kong.

What positive benefits do South African marathon runners associate with their sport?

In the present study, the hypothesis, *South African long-distance runners believe they experience psychological benefits as a direct result of running,* was accepted. It was found by means of both an open-ended question and 21 statements, each rated on a 5 - point Likert scale, that South African marathon runners associate their sport mostly with psychological benefits such as a positive mood, a positive self-image and a positive mental outlook. In the words of a few respondents in the present study, "I have a far better opinion of myself and the rewards of

PBs (personal bests) are psychologically enormously positive", "I'm oozing with confidence" and "I'm in control of my life again after a very bad depressed and ugly time in my life". However, although to a lesser extent, many South African long-distance runners also associate the benefits of physical fitness and health with their sport. To an even lesser extent, they also associate the benefits of family and friends, weight control and goal attainment with their sport. The benefits associated with the sport were best summed up by two respondents, "I feel good mentally and healthwise. I feel sharp, I look good for my age. People admire my energy. I have made many fantastic friends" and " I now feel I'm my own person".

Although all the studies discussed in 2.2 found that marathon runners do enjoy psychological benefits due to long-distance running, one cannot compare these studies to the present one. Most of the studies employed standardized measures such as McNair, Lorr and Droppleman's Profile of Mood States (cited in Morgan & Pollock, 1972) to determine if their subjects did experience psychological benefits because of long-distance running. The present study, however, dealt with perceived benefits. Nevertheless, its findings are in accordance with those of Carmack and Martens (1979), Cole (1980), Callen (1983b) and Chan and Lai (1990). Once again, one may conclude that South African runners associate their sport with the same benefits as runners from elsewhere in the world do. Although not one of the focuses of the present study, it would be of interest to compare the perceived benefits of the sport with the actual benefits experienced. The actual benefits could be assessed by means of standardized psychological and physiological tests.

Furthermore, in the present study, a further two hypotheses related to the benefits South African marathon runners associate

with their sport were accepted. These are, *South African long-distance runners of varying abilities perceive the same psychological benefits as a result of long-distance running* and *Regardless of the distance South African long-distance runners run each week, they perceive the same psychological benefits derived from the sport.* The latter finding should be seen in accordance with the findings of Gondola and Tuckman (1983), Dyer and Crouch (1987) and Tharion et al. (1988). The deductions are similar, even though the studies listed assessed psychological benefits by means of the POMS (cited in Morgan & Pollock, 1972) and the present study assessed perceived psychological benefits by means of 21 statements, each rated on a 5 - point Likert scale.

What negative effects do South African marathon runners associate with their sport?

In contrary to most of the studies discussed in 2.3, the present study focused on two types of negative effects. These are perceived negative psychological effects when runners are unable to run and negative effects as a direct result of involvement in the sport. Most of the studies discussed in 2.3 focused on the former negative effect. Only Robbins and Joseph (1980) and Summers, Machin and Sargent (1983) assessed negative effects derived from running per se. In the present study, both hypotheses related to this research problem were accepted.

The present study found that when unable to run, the majority of South African long-distance runners believe they experience negative psychological effects such as depression, frustration, guilt and a lack of concentration. This finding was determined by means of both an open-ended question and nine statements which were each rated on a 5 - point Likert scale. This was clearly depicted by a respondent who said, "I enjoy most health aspects,

physically and physiologically. Most mental aspects are also improved. If I'm unable to run, there are reverse effects". Hence, the hypothesis, *When unable to run, South African long-distance runners may experience perceived negative psychological effects,* was accepted. These findings are in agreement with most of the findings discussed in 2.3. These include Summers et al. (1982), Callen (1983b), Chan and Lai (1990) and Acevedo et al. (1992). Thus, South African marathon runners, like runners elsewhere in the world, experience perceived negative psychological effects when unable to run. Although not one of the emphases of the present study, a future study could determine if these negative effects runners believe they experience, are experienced in reality or only in perception.

South African long-distance runners also experience negative effects as a direct result of involvement in the sport. The main problems experienced are related to physical injuries and relationships. One respondent in the present study wrote, "When I started to run I overdid it and this sometimes annoyed my wife". Another wrote, "My divorce was a result of running". Robbins and Joseph (1980) also found that long-distance running could contribute to relationship problems. Other negative effects associated with the sport by South African marathon runners are the great commitment involved, the obsession with it, and the financial expense involved. Aptly described by two respondents in the study, "The commitment is often an added stress and I sometimes regret the constant commitment to having to run almost every day" and "prioritizing running has a potential to become self-absorbed and selfish about leisure time". The hypothesis, *South African long-distance runners may experience a few negative effects, such as injury problems and relationship problems, as a direct result of long-distance running,* was acccepted.

What thoughts and moods do South African long-distance runners associate with the runner's high phenomenon, if they experience this euphoric feeling when running?

The hypothesis of this research problem, *The runner's high is an ill-defined concept amongst South African long-distance runners,* was accepted. Although many associate it with positive attributes such as a good mood, confidence, euphoria, optimism, enthusiasm, friendship and accomplishment, it remains poorly defined because of the variety of thoughts and emotions associated with it. This variety of thoughts and emotions associated with the runner's high is reflected when examining the words of a few respondents. One respondent wrote, "My high is what I describe as a 'purple patch', where I click into gear". Another wrote, "I am friendly and united with all fellow runners. It is difficult to say, but I am friendly and mix with runners I know well. I am deaf and also shy". One respondent stated that during a high, "I picture myself gliding past the opposition and often see myself shaking Fordyce's hand at the bottom of Polly Shorts or Cowies Hill". However, another respondent wrote that during a high he didn't have to think as the answers were there for any questions which might have arisen. Perhaps, the runner's high, is best described in the words of one respondent "It is difficult to quantify but it is a feeling of well-being and pride". The present study's findings are in accordance with the findings of Summers et al. (1982), Summers et al. (1983), Callen (1983b), Chan and Lai (1990), Avecdo et al. (1992) and Masters (1992). These studies were discussed in 2.4. Once again, the present study has shown that South African runners are similar to other long-distance runners elsewhere in the world.

Do South African runners who experience the runner's high perceive psychological benefits with the same intensity as those runners who do not experience the runner's high?

The researcher whilst surveying the literature on psychological aspects of long-distance running did not find any study which had tackled this research problem. This is possibly due to the fact that the runner's high is a vague, ill-defined concept. As the researcher is personally involved in the sport, it was decided to tackle the problem.

Results show that the hypothesis, *South African runners who experience the runner's high perceive psychological benefits with the same intensity as those runners who do not experience the high*, was rejected. It would appear that those who experience the runner's high do experience psychological benefits more intensely than those runners who do not experience the high.

In conclusion, the present study has shown that South Africans become involved in long-distance running chiefly because of physical fitness and health reasons, and remain involved in the sport for these reasons as well as psychological benefit reasons. Furthermore, South African long-distance runners experience many benefits, especially psychological benefits, due to their involvement with the sport. When unable to run, these psychological benefits are reversed and South African runners tend to experience negative psychological effects. Finally, the present study has shown that the phenomenon of the runner's high is a vague, ill-defined experience amongst South African long-distance runners. Those who experience the runner's high tend to experience psychological benefits more intensely than those who do not experience it.

The intention of this study was to describe the South African long-distance runner. This has been achieved and thus, this study can be seen as a springboard for further studies, which could answer speculative questions arising from the present study. Chief amongst these is: As South African long-distance runners experience perceived psychological benefits, could running be implemented in therapeutic programs? This is possible as one respondent in the present study wrote, "I lost my wife and son rather tragically and running saved my life". However, further studies need to determine this. Furthermore, as indicated previously, further studies are needed to determine if the perceived benefits associated with the sport are merely perceived or if they are experienced in reality too. In other words, do South African long-distance runners really experience a positive self-image, a positive mood and a positive mental outlook as a result of running or do they merely perceive these benefits? If psychological benefits are experienced in reality as a result of long-distance running, participation in the sport could be implemented in therapeutic programs. Further studies are also needed to determine why the psychological benefits associated with the sport are experienced.

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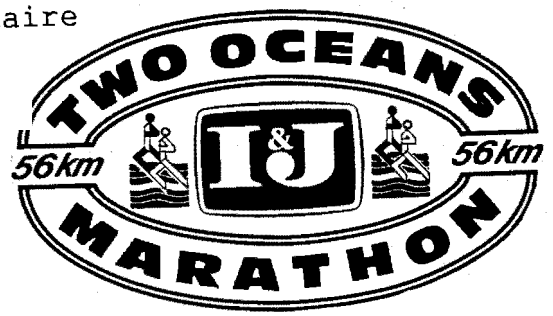
APPENDIX 1 - Questionnaire



PSYCHOLOGICAL ASPECTS OF LONG-DISTANCE RUNNING AMONG SOUTH AFRICAN MARATHON RUNNERS

Very few sports are as popular in South Africa as long-distance running. Although much has been written about the physiological aspects of road running, little attention has been given to the psychological benefits of the sport. This questionnaire has been designed to determine what emotional and mental benefits long-distance runners derive from running. It would be greatly appreciated if you would assist in this research project by answering the following questions honestly. When completed, please return the questionnaire in the stamped envelope provided. The information supplied by you will be treated in the strictest confidence. Thank-you for your support.

****

PART ONE: PERSONAL PARTICULARS

1. Surname _____
2. First name: _____
3. Two Oceans Marathon Race Number: _____
4. Club: _____
5. Age: _____ 6. Sex: _____
7. Marital Status: _____
8. Occupation: _____
9. What other sports are you actively involved in at present? _____

   _____
10. What sports have you played, but are no longer involved in? _____

    _____

****

PART TWO: RUNNING HABITS

1. How long have you been involved in long-distance running? _____
2. Best marathon time: _____
3. Number of Two Oceans Marathons completed _____
4. Best Two Oceans Marathon time _____
5. Number of Comrades Marathons completed _____
6. Best Comrades Marathon time _____
7. How many kilometres a week do you run during March and April? _____

8. On average, how many kilometres do you run a day during the other months of the year? _____

9. Do you run - alone always ☐
   - usually alone and occasionally with others ☐
   - usually with others and occasionally alone ☐
   - with others always ☐
   (Mark applicable box with X)

10. Why have you entered this year's Two Oceans Marathon? _____

_____

****

PART THREE: THE BENEFITS OF RUNNING

1. For what reason(s) did you originally become involved in running? __

_____

_____

2. What are the three most important reasons you are now involved in running? _____

_____

_____

3. Consider the following statements. On a scale of 1 to 5 rate how each statement applies to you personally.
   Use the following guideline: 5 - Always true
   4 - Often true
   3 - Sometimes true
   2 - Seldom true
   1 - Never true

   For each statement, circle your rating.

* Running is extremely important to me 1 2 3 4 5
* When I cannot run, I feel depressed, tired and irritable 1 2 3 4 5
* After a run, I can think more clearly 1 2 3 4 5
* I have more energy to carry out everyday activities because of running 1 2 3 4 5
* If I miss a run, I'm angry with myself 1 2 3 4 5
* Running has given me the insight and tenacity to face challenges in my life 1 2 3 4 5
* When I have had a run, I'm usually in a good mood 1 2 3 4 5
* I feel uncomfortable when I'm unable to run 1 2 3 4 5
* I do not suffer from depression because I run..... 1 2 3 4 5
* Running has taught me to be assertive 1 2 3 4 5
* I feel I have to run at least once a day 1 2 3 4 5
* Running has given me a knowledge of my physical capabilities 1 2 3 4 5
* Running makes me feel relaxed 1 2 3 4 5
* When I cannot run, I feel restless and frustrated 1 2 3 4 5
* Running has put a strain on my personal relationships 1 2 3 4 5

* Life is much richer as a result of running 1 2 3 4 5
* When I'm unable to run, I often find myself in a bad mood 1 2 3 4 5
* I will rearrange or change my schedules in order to fit in my daily run 1 2 3 4 5
* I am more creative when I'm running 1 2 3 4 5
* Running keeps me alert 1 2 3 4 5
* Because of running I feel physically attractive 1 2 3 4 5
* Running gives me a sense of well-being 1 2 3 4 5
* When I miss a run I feel guilty and that I have let myself down 1 2 3 4 5
* Running is an answer to my problems 1 2 3 4 5
* I am enthusiastic about life because of running 1 2 3 4 5
* I would be happy if I ran less 1 2 3 4 5
* Running helps me get rid of tension and anxiety 1 2 3 4 5
* When I cannot run, I find it difficult to concentrate at work 1 2 3 4 5
* Running gives me self-confidence 1 2 3 4 5
* Ilook forward to running 1 2 3 4 5
* When I am unable to run I feel less energetic and unfit 1 2 3 4 5
* Happiness is running 1 2 3 4 5

4. What positive benefits do you experience in your life as a result of running? _____

_____

_____

5. Has running had any negative effect in your life? _____

_____

_____

****

PART FOUR: THE RUNNER'S HIGH

1. Have you ever experienced an emotional "high" associated with running? _____

   If your answer to the above question is 'yes', continue with the question. If your answer is 'no', thank-you for your support.

2. Does obtaining a "high" depend on how far you run? _____
3. Approximately how far have you run when you experience a "high"? _____
4. How long after you started running did you notice a "high"? _____
5. What % of your runs are associated with a "high"? _____

6. Does your "high" occur - only during training ☐
   - during training and races ☐
   - only during races ☐
   (Mark applicable box with X)

7. What emotions/feelings do you experience during a "high"? _____

_____

_____

8. What do you think of during a "high"? _____

_____

_____

9. What happens to you during the runner's high? Consider the following. Merely write yes or no in response to each statement.
DURING A "HIGH"...

... My worries fade away. _____

... I just let my mind go. I am not completely aware of my surroundings. _____

... I seem to float. _____

... My mind is detached and dreamy. _____

... I have a sense of confidence and well-being. _____

... I have a feeling of euphoria, almost unreal happiness. _____

... I consciously try to solve a problem or figure something out. _____

... I am optimistic. _____

... I am friendly and united with all fellow runners. _____

... My mood and morale lift. _____

... I am creative. _____

... I am relaxed and tranquil. _____

... I have a sudden flash of insight when I least expect it. _____

... I am energetic and enthusiastic. _____

... I meditate. _____

THANK-YOU FOR YOUR SUPPORT!

APPENDIX 2

Means, standard deviations and item-total correlation of the 32 statements each rated with a 5 - point Likert scale

Item	M	SD	Itm-Totl correl.
1. Running is extremely important to me	4,06	0,91	0,619740
2. When I cannot run, I feel depressed, tired and irritable	3,47	1,09	0,613648
3. After a run, I can think more clearly	3,88	0,99	0,542844
4. I have more energy to carry out everyday activities because of running	3,99	0,98	0,482926
5. If I miss a run, I'm angry with myself	3,18	1,15	0,592813
6. Running has given me the insight and tenacity to face challenges in my life	3,73	1,16	0,665661
7. When I have had a run, I'm usually in a good mood	4,19	0,82	0,533822
8. I feel uncomfortable when I'm unable to run	3,61	1,08	0,626377
9. I do not suffer from depression because I run	3,38	1,42	0,442605
10. Running has taught me to be assertive	3,08	1,25	0,619835
11. I feel I have to run at least once a day	2,97	1,38	0,523469
12. Running has given me knowledge of my physical capabilities	4,17	0,92	0,498124

Item	M	SD	Itm-Totl Correl
13. Running makes me feel relaxed	4,22	0,81	0,564763
14. When I cannot run, I feel restless and frustrated	3,54	1,12	0,671106
15. Running has put a strain on my personal relationships	2,15	1,12	-0,038061
16. Life is much richer as a result of running	3,87	0,97	0,649819
17. When I'm unable to run, I often find myself in a bad mood	2,99	1,14	0,543890
18. I will rearrange or change my schedule in order to fit in my daily run	3,44	1,11	0,540128
19. I am more creative when I'm running	3,35	1,07	0,597130
20. Running keeps me alert	3,84	0,90	0,622970
21. Because of running I feel physically attractive	3,46	1,15	0,477988
22. Running gives me a sense of well-being	4,20	0,80	0,583422
23. When I miss a run I feel guilty and that I have let myself down	3,18	1,18	0,594209
24. Running is an answer to my problems	2,43	1,15	0,514888
25. I am enthusiastic about life because of running	3,28	1,10	0,622003
26. I would be happy if I ran less	2,00	1,11	-0,149172
27. Running helps me get rid of tension and anxiety	4,12	0,89	0,541851
28. When I cannot run, I find it difficult to concentrate at work	2,64	1,10	0,537693

Item	M	SD	Itm-Totl Correl
29. Running gives me self-confidence	3,62	1,10	0,623656
30. I look forward to running	4,10	0,84	0,570654
31. When I am unable to run I feel less energetic and unfit	3,72	1,07	0,484979
32. Happiness is running	3,75	1,12	0,634865

APPENDIX 4 - Scree Plot of Eigenvalues.